Mr. Blackett

FAMILIAR ARCHITECTURE;

CONSISTING OF
Original Deſigns of Houſes for Gentlemen and Tradeſmen,
Parſonages and Summer-Retreats;
With Back-Fronts, Sections, &c.

TOGETHER WITH
Banqueting-Rooms, Churches, and Chimney-Pieces.

TO WHICH IS ADDED,
The Maſonry of the Semicircular and Elliptical Arches,
with practical Remarks.

By **THOMAS RAWLINS**, Architect.

Printed for the AUTHOR, M,DCC,LXVIII.

N.B. *No Copy of this Work is authentic that has not my Name in my own Hand-Writing affixed to it in the Title Page.* Rawlins

BRITISH MUSEUM

TO THE

PUBLIC.

ARCHITECTURE is a Science ſo well known, ſo judiciouſly treated by various Authors, and ſo clearly exemplify'd by well conducted Plans and Deſigns, as to render any Repetition here needleſs, as well as foreign to the Purpoſe.

THE many excellent Geniuſes, who have largely expatiated on this Subject, have form'd Plans too extenſive for the plain Villa, the Parochial Church, and elegant Manſion: Their lofty Views, and unlimited ſtrength of Imagination, have ſo far hurried them away, that they have neglected to render their Deſigns uſeful and inſtructive to Country Builders.

ONE of our ableſt modern Writers on the Art of Structure (ſpeaking of Deſigns in general) ſays, that he means not ſmall Houſes, tho' at the ſame time he confeſſes they often require the Skill and Direction of an Architect.

THE many Objections made by Gentlemen, and Artiſts, to the Plans and Deſigns already publiſhed, are obvious: For, waving their Magnitude and Expence; the Offices being under Ground, no way anſwer the Uſes required in the Country; where, in general, there may be found ſufficient Space above: Though in Town, indeed, Reſtriction and Expence of Ground-Rent are often productive of many Inconveniencies.

IT muſt give the higheſt Satisfaction to a ſpeculative Genius, to conſider the utmoſt Extent of Architecture, and to weigh the different Effects it impreſſes on the Mind, according to the different Structures preſented to the View! How awe-ſtruck muſt be the Paſſions, when we behold the antient Buildings of *Greece* and *Rome!* How ſooth'd and mollify'd, when we deſcend to the pleaſing rural Cot, where ſimple Elegance, Proportion, and Convenience unite! The Soul may then be ſaid to be tun'd and exhilarated by the Objects which ſtrike the Attention.

CONSCIOUS as I am of the difficulty of my Taſk, ſo am I aware that ſome may be inclined to queſtion, whether a Man engaged in any particular Branch of Buſineſs, can have leiſure enough to cultivate ſo copious a Study as that of Architecture in general: Such I muſt refer to the Work itſelf------From thence let them draw their Anſwer.

THUS far however, I preſume to plead in its Behalf: Every Man has ſome favourite Aim in view, be it Study, Buſineſs, or Pleaſure. That which the Mind is moſt earneſtly bent upon, we moſt cloſely purſue: That which is moſt cloſely purſued, will doubtleſs be brought neareſt to Perfection: The Study which Nature directs us to, has unqueſtionably the ſtrongeſt Prevalence on the Mind: For while we labour, we may be ſaid to ſport; and Toils are converted into Delight.

WHAT I would infer from hence is, that this Science having been from Infancy my conſtant Amuſement, the Entertainment of my leiſure Hours, and being cloſely connected with my Occupation *, it may not be deem'd extraordinary, if I ſhould have made ſome ſmall Progreſs in it.

IN the Courſe of this Work, there is as little regard paid to Town-Buildings, as former Authors have beſtow'd on thoſe in the Country.

UNMIX'D Elegance, and explanative Uſefulneſs in the Offices, I apprehend to be one of the moſt eſſential Parts of Deſign: Which, together with the *Grecian* and *Roman* Purity, join'd to the harmonious *Dictates of Nature and Science*, are ſtrictly adher'd to; therefore I have preferr'd them to

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* A Stone Maſon.

Gaiety and Ornament. If they are any where touch'd upon, 'tis merely to ſhew where ſuch Embelliſhments may be juſtly appropriated and diſplay'd.

A Person inclinable to build, if he duly ſurvey his intended Spot of Ground, and ſtrictly conſider the Offices he may have occaſion for, will find a great difference between a pleaſing, undecorated, convenient Pile, and a wild Maſs of ſuperfluous Lumber, that muſt unavoidably offend the Eye of every judicious Beholder: For Proportion, Convenience, and Nobleneſs, may be ſeen in the moſt native Simplicity.

The lofty and extenſive Ideas of our great Authors, being ſolely confin'd to Statelineſs and Splendor, riſe to ſo ſuperb a Strain, that they can be of little Aſſiſtance to the Studies of the young Architect. For before he can be made acquainted with the neceſſary Conveniencies of a Building for a ſmall Family, he is hurried imperceptibly away with extatic Views of becoming great at once.

From ſuch Imaginations, I muſt, for my own Part, beg leave to diſſent: My Plan being to form ſomething that may be of great Utility to the Public in general, which I prefer to all other Views.

In Towns and Villas, Architects are rare to be met with: Therefore this Work is ſo calculated, that the meaneſt Capacities may comprehend it: The great Variety of Plans here explain'd, are to point out the many different Conveniencies that may be made in a Houſe from Thirty to Sixty Feet in Front, and upwards: This I thought would improve their Ideas, and make them capable of conducting ſmall Buildings with Freedom, Simplicity, and Elegance.

The ſuperb they muſt not expect; as the Proprietor will certainly conſult Men of the greateſt Abilities.

A late ingenious Architect in his Treatiſe, ſays, " That he has not ſet down the various Uſes and Diſtributions of the Apartments in any Structure"------'Tis to be wiſh'd he had------For if the young Students are to make Convenience their Study, without ſome fix'd Baſis, from whence are their Ideas to ſpring? That a foundation in Knowledge muſt be laid in the leſſer Works, e'er he can hope to reach Perfection in the greater, will, I think, admit of no Diſpute.

I IMAGINE, pointing out the neareſt Way of forming Plans agreeable to the Ground allotted, with as much Conveniency as the nature of the Place will admit of, muſt give to real Geniuſes a fair Opportunity of improving and bringing Deſign to the greateſt Perfection.

AS I have before mentioned the Inconvenience of Offices under Ground, I may be allow'd to deſcant ſomewhat farther on them. The Heats and Steams ariſing from Kitchens ſo ſituated, are not only diſagreeable, but unhealthy:------Yet when the Offices are properly diſpoſed in Wings, or, at the moſt diſtant Parts of a Houſe, as here delineated, every Nuſance will be carry'd off, every unpleaſing Stench avoided, and the whole render'd commodious as well as wholeſome.

SINCE I am ſpeaking of the Wings, I muſt take notice, that every particular Convenience is not conſider'd: For it often happens, that Perſons poſſeſs'd of equal Property, as their Spirits or Tempers vary, may not require the ſame Accommodations: Theſe therefore may be either contracted or enlarged at pleaſure.

FREQUENT Obſervations have been made, that where there are large Halls, with croſs Paſſages, in ſmall Buildings, the Rooms in general are no better than Lobbies; which Inconvenience is here carefully avoided, as far as the Plans inſerted will admit of.

A PROPER Entrance, with free Communications to each Apartment, without going through another, forms the whole commodious.

ARITHMETICAL Proportions being particularly regarded, the internal Parts may be made to ſuit the Temper, Genius, and Convenience of the Inhabitant, by enlarging, or reducing the Scale. And I flatter myſelf, (by the Diverſity of Examples) that it will enable Gentlemen to interchange any of the Wings which may moſt pleaſe them, with whatever Houſe beſt ſuits their Conveniency: Or, to alter an old bad Plan to a more commodious one, and at the ſame Time to give the neceſſary Directions themſelves; the whole being familiariz'd and explain'd in the eaſieſt Terms, for that Purpoſe.

There are ſome ſew Things more in this Undertaking neceſſary to be obſerv'd. The Lengths and Widths of the Fronts, as expreſt in the References, are only the Clear of each Room. As all Perſons that build are not willing to go to an equal Expence, ſome liking thick, others thin Walls, and ſome only Stud-work: Yet, which ever they make uſe of, the Dimenſions will very nearly carry the ſame Proportion. I have figur'd down the Dimenſions in each Room, and mark'd the Kitchen with a K: ſo that by examining the Plan, every Apartment is preſented at once to the View; which will facilitate and ſtrengthen the Conception.

I have not ſet down the Dimenſions of each Door or Window, referring them to the Scale; nor have I introduc'd any order for the Cornices: But wou'd recommend to the Student the avoiding ſuperb Cornices and Door Caſes to plain Buildings.

Nor have I given any Eſtimation to the ſeveral Deſigns, as have been practis'd by ſome Authors; ſuch as that by the great Square, the Prices of Materials and Work, &c. Thoſe Methods appear to me, not to have been ſo well conſider'd as they ought to be; but to have been the Cauſe of many Conteſts between the Owners and Builders, to the Prejudice of many induſtrious Men of Integrity in the County. I would only aſk, how a Man can pretend to eſtabliſh certain and invariable Rules (if his Work is deſign'd for general Uſe to the Public) when the Prices of Materials, Carriage, Wages, and other Charges, vary ſo very conſiderably in different Parts of the Nation, as well as the different Methods of Building? I would therefore adviſe the young Architect or Builder, as ſoon as his Plans and Deſigns are fix'd on, to inform himſelf of the Prices of all the Materials, (and other Expences attending it) that are to be had neareſt to the Spot of the intended Edifice. This is the only way of Eſtimation: Such Rule as this cloſely purſued, will be moſt laſting and ſatisfactory to the Proprietor, and is the only Method to eſtabliſh the Character of every judicious and honeſt Workman.

Many Gentlemen, &c. have made Objections to broken Pediments, that is, where the horizontal Cornice under them is continued only three, four, or more Feet on the Front at each End. Now if that be a fault, the Blame is not to be laid on the Deſigners in the preſent Age, as their Invention; becauſe we have theſe Examples laid down to us by that great Maſter *Andrea Palladio*, and others: And if we were to confine ourſelves only to whole Pediments, there would be no Variety.------Notwithſtanding this, I would not recommend them in large Buildings where there are Columns, or Pilaſters, nor where whole Entablatures are introduced. But in little Buildings with ſmall Cornices only, or a Cyma and Facia, in my Opinion, they have a light pleaſing look, eſpecially if a little Ornament is introduced in them. Thereſore, the greateſt Part of the Elevations where I have deſign'd them, may be made either way. In two late Publications, Diſputes have ariſen about the Qualifications requiſite for an Architect: I cannot entirely acquieſce in the Opinion of either Author.

THE one alledges, That you muſt be well acquainted with the Prices of all the Sorts of Materials and Work, that you may not be liable to the Impoſitions of mercenary Workmen:------And I hope too, for better Reaſons than ſo illiberal and indiſcriminate a Suſpicion.

ONE Qualification for an Architect, I preſume is, to be thoroughly acquainted in the practical Part of Building, which muſt be gained by a cloſe Application and much Experience in the different Branches. Thus he will be the more able to form a Judgment, when he draws a Deſign, whether it can be apply'd to Practice; and whether all the Parts, when fix'd on their proper Baſis, ſtand in a State of Equilibrium. If this had been the firſt Principle of their Study, we ſhould not ſee the many Blunders in the executive Part ſo often committed.

AS for adjuſting the Prices, how can a Theoriſt, who gets his Knowledge only in a Study, judge the Value of Work? when at the ſame Time, if he knew how many Feet, Yards, or Squares, one or more Workmen can perſorm in a Day or Week, &c. he might then have a thorough Knowledge of Charges; be able to find out thoſe who are more mercenary than honeſt, and to diſtinguiſh and recommend Workmen of ſtrict Integrity; who, I believe, are many.

The other Author wou'd inſinuate, That a proficiency in Architecture can hardly be attain'd without Travelling. With reſpect to this, my Opinion is, That the Seeds of Genius are ſown in the Mind at our firſt Formation in the Womb, which may be term'd innate Ideas, or ſuch as Nature has implanted in us. And if this natural Genius be cheriſhed, improved, and refin'd by proper Methods of Study and a cloſe Application, it gradually grows to Maturity.

When a Man is ſo happy as to be born with ſuch a Talent, the difference I believe would be very ſmall, whether he travell'd, or cloſely examin'd the Copies of the remains of thoſe antient Monuments, taken by the many ingenious Gentlemen who have given us their Meaſures; which are of uſe to us in Study, for the Refinement of our Taſte in the Ornamental Part.

I shall not pretend to ſo many Sciences as ſome do, but only to that of Architecture: For, as Mr. Pope obſerves in his Eſſay on Criticiſm,

One Science only, will one Genius fit,
So vaſt is Art, ſo narrow human Wit.

How far I have ſucceeded in this my firſt Attempt to form a Work of real Uſe to the Public, I ſhall leave to the Determination of all candid, ingenious and impartial Judges.

Some few Errors in the Drawings and Engravings may have eſcaped my Notice; but I hope they are pardonable: And ſhall conclude this Subject with ſaying, that as long as we carry Nature, Utility, and Harmony in our Ideas, ARCHITECTURE will be the Admiration of all Ages.

⁂ What is here preſented to the Public, I undertook to calculate for the laying a Foundation for a Work of general Uſe, and eſpecially in the remote Parts of the Country, where little or no Aſſiſtance for Deſigns is to be procured; as alſo for the Inſtruction of Youth after their Study of the Five Orders: (which I have not introduced in this Work, there being ſufficient Inſtructions about them already publiſhed.) And their cloſe Application to this Treatiſe, I flatter myſelf, may be the means of improving their Ideas, and rendering their Works uſeful.

I MUST beg leave to caution the young Architect, not to let his Fancy flow into Luxuriancy by a Multiplicity of Members, Ornaments, and Dreſs.------As Elegance does not conſiſt in an exceeding Superfluity, but in natural Proportions, Freedom, and Harmony mingled with Neatneſs and Simplicity: Theſe are the Foundations on which he muſt build his Hopes for Succeſs. And as I before obſerv'd, let him ſtudy and make himſelf well acquainted with the neceſſary Conveniencies for the Completion of ſmall Buildings, before he aſpires to Schemes of Palaces, which he may never probably have occaſion to apply to Practice.

The AUTHOR.

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Practical REMARKS on
ARCHES, &c.

THE many ingenious Authors on the Subject of Arches have hitherto confin'd themſelves to the Theory; and by their exact and judicious Calculations, have endeavour'd to prove the Strength of each of their favourite Curves.

As none, that I know of, has wrote on the Practical Part, and particularly in a late Diſpute concerning the Strength of the Semicircular and Elliptical Arches: I have taken this Opportunity (without intending to engage in any intricate Diſputes) to communicate my Sentiments, form'd from natural Ideas, cultivated in the Studies of my Occupation. Therefore my Deſign is to explain the Practical Part, and to convey ſuch Hints as will render it uſeful to thoſe who make Architecture their Study; but more particularly for the Improvement of the young Student; to whom I ſhall propoſe the two following Queſtions.

What is an ARCH in Geometry?

It is any Part of the Circumference of a Circle or curv'd Line, extending from one Point to another.

What is an ARCH in Maſonry?

It contains a number of Stones, hewn out and wrought, which when ſet in their proper Places, are as one ſolid circular Courſe, whoſe lower Ends form any Part of a Circle or curv'd Line, calculated to ſupport any Weight, proportionate to their Strength and Figure.

* "All ſolid Materials, free from Impediments, deſcend perpendicularly; "because Ponderoſity is a natural Inclination to the Center of the Earth, and Nature performeth her Motions by the ſhorteſt Lines."

This proves, that all Arch-Stones muſt be drawn from their central Points to form the Curve; otherwiſe their Bearings will be rendered imperfect.

The firſt Arch I ſhall deſcribe is the Semicircular, without the additional Maſonry: *Fig.* I. Draw a Chord (or ſtraight Line) from *g* to *g*, in the Middle of which fix your Center *C*. The Diameter from *A* to *B* I propoſe to be 50 Feet. After having circumſcrib'd your Line from *A* to *D*, and to *B*, divide it into 33 Parts; then extend another Circle *e e e.* allowing three Feet for the Thickneſs of the Arch *C* to *m*. From each of your 33 Diviſions, with your Rule, draw a Line from *C* through the Point *d* to *e*: which when done, forms 33 Vouſſoirs or Arch-Stones.

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* From Sir *Henry Wotton's* Theorems.

HAVING drawn your Arch, the next thing is to prepare a Mould for working each of the ſaid Stones. What is meant by a Mould, is, a piece of Deal or other Board about half an Inch thick, cut very exact to fit the Front-Face of the Drawing for each Arch-Stone; ſo that all the Stones when wrought muſt fit that Mould either Side uppermoſt. By this Means, any Stone may be ſet on either Side or Top of the Arch.

ANY Segment of a Circle is wrought in the ſame manner as the Semicircle, if the Lines be drawn from the ſame Center: And the Bed of the Springing-Stone, which the Arch ſtands upon, muſt be drawn from the ſame central Point.

THE Elliptical Arch I have drawn as generally deſcrib'd by Workmen, viz. on three Centers, as 1 2 3. The Width on the Chord or ſtraight Line, and the Thickneſs of the Arch, the ſame as the Semicircle, and conſiſts of 29 Arch-Stones, each being nearly of the ſame Dimenſions at the Bottom as the Semicircular, *f f f f. Fig.* II. Draw a Chord or ſtraight Line of the ſame Length as the Diameter of the Semicircular; being 50 Feet in the Opening: divide the Diſtance from *a* to *e* into four equal Parts, as *a* 1, 1 *d*, *d* 2, 2 *e*: From the Center 1 deſcribe the circular Arch *a b*: alſo *e g* from the Center 2: then from the Center 3, deſcribe the circular Arch *b c d*. From theſe different Centers the outſide Curves are drawn *h h h*, limiting the Thickneſs of the Arch *l* to *m*, which is 3 Feet; which Stones being deſcrib'd from different Centers, they require different Moulds to form them. Thoſe taken from the Center 3 are the number from *k l* to *k*: the others taken from 1 and 2, form each their Stones from *a* to *b*, and alſo from *e* to *g*.

N. B. I have not drawn the Arches thicker at Bottom than Top, as has been propoſed by ſome; which may be a very good way of doing them, if each Arch-Stone be wrought out of one Piece: but as ſuch a number of large Blocks are not always to be had from a Quarry without ſome Difficulty; the manner I have here laid down in *Sect.* 1, is equally as ſtrong, for Arches can never give way at the Foot (if the Piers will ſtand) but will deſcend perpendicularly from the Crown of the Arch or thereabouts.

THE inſide Figure of an Arch does not alone determine its Strength; it is, the different Thickneſs of the Stones and Joints taken from one or more Centers, that does it.

NOW, as I have already obſerv'd, the Proportions of the Semicircular (*Fig.* I.) are every where equal, are all wrought by one Mould, taken from one Center, and form all their Joints alike; which when ſet in their Places, muſt receive an equal Preſſure on each of them, and will appear the moſt graceful, natural, and eaſy. And, reſpecting its Offices in bearing, it appears to me not to have a perpendicular Preſſure on the Piers: and I think, it cannot have a lateral Preſſure; as it ſuſtains itſelf from the Top to the Bottom in a State of Equilibrium. And wherever an Arch is taken from more than one Center, it cannot be in Equilibrio; and the Reaſon of this you may form a Judgment of by the following Elliptical Arch.

The Elliptical Arch, as in *Fig.* II. being taken from more than one Center, requires two different Moulds to form the Stones by: The ſhortneſs of the one Radius, from 1 and 2, and the extraordinary length of the other from 3, occaſion ſuch conſiderable Difference in the Form of the Arch-Stones, that the upper ones are nearly to a Parallel in the Joints; and thoſe from the Centers 1 and 2, are about ⅕ wider at their Top than they are at the Bottom: The Difference being ſo great in their Beds, (as you will obſerve in the Drawings) muſt cauſe a very unequal preſſure: For if their Joints or Beds are unequal, the preſſure conſequently will be ſo too, and the Stones that ſhould be the ſtrongeſt are at bottom inſtead of the top: That the nearer they come to a parallel in the Joints or Beds (as mention'd above) on the upper Part of an Arch, the weaker it is; and the wider they are on top, the ſtronger; will, I think, admit of no diſpute. For if an Arch of this kind give way, the Stones that are neareſt to the top are in the greateſt danger of falling, as it will naturally ſpring at K, being furtheſt from the Line of the lateral Preſſure. I am treating only of the Arch itſelf: For Art may be made uſe of, to ſecure it in the Joints, as well as the Spandrels and Haunches.

As many Diſputes have ariſen, relating to the Strength of Arches; I take the liberty to offer my Opinion on that Subject; which is, That, that Arch (of whatever Curve) where all the Stones are wrought by one Mould, and their upper Ends in a wider Proportion to the lower than any other, is the ſtrongeſt Arch that can be, (ſuppoſing it 50 Feet opening, and the Ends no more or leſs than as figured in the Plate.) For, if by Torrents, the flux and reflux of Tides, or ſome other Cauſe, the Foundation ſhou'd give way, (as I preſume that Bridges are not always erected on Rock or Chalk Bottoms) ſo that you find the Piers ſinking, and in conſequence the Strength of the Maſonry in the Piers and Spandrels broken, and the Arch-Stones in danger of dropping through; then, which Key or Arch-Stone will ſtand longeſt? that which is 2 *F.* 4 ¼ *In.* at Bottom, and 2 *F.* 8 *In.* at the Top; or that which is 2 *F.* 3 ¾ *In.* at Bottom, and 2 *F.* 6 ¼ *In.* at Top? I believe this requires very little Conſideration to determine. In reſpect to their Beauties in deſign, I would only aſk, which is moſt pleaſing to the Eye; a ſtraight well-proportion'd Man, with a ſtrong plain Coat on, or a Man with hunch'd Shoulders bedeck'd with gaudy Trappings.

Having peruſed the Opinions of ſome of the Mathematicians, I ſhall here make ſome Remarks on what the ingenious Mr. *Emmerſon* has ſaid upon Arches, in his Work entitled, The Principles of Mechanics. *Fig.* 307, " *D. B. F.* is the Arch of a Bridge, which ſhall ſuſtain itſelf, and all the Parts of it in equilibrio. Such an Arch will be ſtronger than any other, " becauſe an Arch that can ſuſtain itſelf, will more eaſily ſuſtain an additional Weight, than an " Arch that cannot ſuſtain itſelf, but only by the coheſion of the Morter. This Arch, *D. B. F.* " is a Semicircle." Thus far he ſupports me in my Opinion of the Semicircle. But in the 10th Line he ſays, " But as this Form is not commodious for a Bridge"——I preſume he thinks it will riſe too high on the Top; eſpecially, if the Banks ſhould be lower than ordinary, ſo that it may occaſion the Aſcent to be tireſome.

As much has been ſaid of the Catenary, I ſhall here borrow his Sentiments at large on the Strength of ſuch an Arch. *Fig.* 311. " If any Architects or Builders of Churches or Bridges, " ſhall pleaſe to make uſe of this Curve here conſtructed (*Fig.* 311) for the Form of an Arch, " they will find it the ſtrongeſt Arch poſſible to be made, for theſe given Dimenſions. And " where many thouſand Pounds are laid out in building a ſingle Bridge, it is certainly worth the " pains, to ſeek after the Form of an Arch which ſhall be the ſtrongeſt poſſible, for ſupporting ſo " great a Weight. And it is very ſurprizing that no body has attempted it. Inſtead of that, all " People have contented themſelves with conſtructing circular Arches; not knowing that different " preſſures againſt the Arch, in different Places, require different Curvatures, which does not

" anſwer in a Circle where the Curvature is all alike. A Circle, it is very true, is very eaſily de-
" ſcribed, and that may be one reaſon for making uſe of it: But ſurely, the Deſcription of the
" Curve here given, is very eaſy by the foregoing Table, and can create no difficulty at all. If
" there be any difficulty in the Practice, it is only in cutting the Stones of a true Curvature, to
" fit the Arch exactly in all Places; but this is eaſily managed with a little care, by taking pro-
" per Dimenſions, obſerving that every Joint muſt be perpendicular to the Curve in that Point.

" A CIRCLE, or any other Curve where the Curvature is not properly adapted to the
" Weight ſuſtained, is not capable of ſuſtaining ſo vaſt a Weight, but muſt in time give way,
" and fall to ruin; except the Morter happen to be ſo ſtrong as to keep it together. On the
" contrary, the Arch here deſcribed, ſuſtaining every where a quantity of Preſſure proportio-
" nal to its Strength will never give way, ſo long as the Piers, which are its Baſis, ſtand good;
" but by virtue of its Figure, will ſtand firm and unſhaken, as long as the Materials the Arch
" is made of will laſt."

IN aſſerting this Arch to be the ſtrongeſt poſſible, I preſume he does not mean to prefer it to the Semicircular; becauſe this wou'd be manifeſtly to contradict what he ſays himſelf concerning the Semicircular Arch in the 307 *Fig.* "That ſuch an Arch will be ſtronger than any other." As to the Form of the Catenary, if ſo call'd, (its Name being not mentioned in *Fig.* 311) it appears to be a very ſtrong one: The Height and Width on the Chord or ſtraight Line being the ſame as the Semicircular, and drawing nearer to the Line of the lateral Preſſure, if built on Piers, the Arches will form ſuch a Truſs againſt each other, as to cauſe a central Preſſure direct on the middle of the Pier or Piers, which makes the bearing of the Foundations on the Ground the more eaſy. But I cannot ſee, why this Form ſhould be of a better Conſtruction than the Semicircular, which he ſays indeed (but for what Reaſon I know not) "Is not a commodious " one for a Bridge;" though their Heights and Widths on the Chord are the ſame. As for " the different Preſſures againſt the Arch in different Places requiring different Curvatures, &c." if by the different Preſſures againſt the Arch he means againſt the Sides, the Semicircular is ſtronger than the Catenary; and if the Preſſure is extraordinary great there, then the Semicircular muſt be the very ſtrongeſt; "becauſe an Arch that can ſuſtain itſelf will more eaſily ſuſ- " tain an additional Weight:" and being further from the Line of the lateral Preſſure than the Catenary, is the more able to reſiſt that inward Preſſure; notwithſtanding they are both able to bear any Weight proportionate to their different Forms. For the number of Stones which form the circular Courſe were deſign'd with Joints to render the Arch flexible, as in all Buildings they will naturally ſettle to each other, for the ſupport of various and unequal Bearings. I'll only aſk one Queſtion, whether the Ponderoſity that is laid on the Arch itſelf can be equal on the Top, Bottom, and Sides? If not, then this proves, that all Arches have different Preſſures on them, and none can equal the Semicircular for their Support.

NOW in caſe of an extraordinary Preſſure on the Spandrel K, in the Ellipſis, it would be the only means of ſecuring the Crown of that Arch from falling in.

THE Conſtruction of the Maſonry of this Form greatly ſurpriſed me; when on examining the *Plate* 41, and *Fig.* 311, I found all the Courſes of the Stones ſet horizontally, and only the Ends curv'd or fitted to the form of the Arch (ſo call'd.) This manner I thought could not be his Deſign; 'till I examined the Deſcription, where he ſays, "If there be any difficulty in the " Practice, it is only in cutting the Stones of a true Curvature to fit the Arch exactly in all Pla- " ces." I hope he does not imagine, that an Arch of ſuch Conſtruction, can be put in practice; or, "by virtue of its Figure, will ſtand firm and unſhaken." I abſolutely declare to the contrary: It will ſtand no longer than the Center remain under it; and no Morter can be made for the Arches of a Bridge that will preſerve it from falling; that being always ſubject to wet and dry, and all changes of Weather. No Curve can ſtand without being form'd with a circular Courſe in Stone, Bricks, or ſuch like Materials, (Wood work is out of the queſtion) therefore it is no way "ſurprizing that it has not been attempted." But the way to form a Judgment of its Strength and Utility, would be, to divide it into a number of Arch-Stones; and to point out where the Center or Centers muſt be for the Joints or Beds to be drawn from.

If he thinks I err in what I have aſſerted, let him peruſe the Works of antique and modern Architecture, and try whether he can find an Arch of his Conſtruction. If any ſuch have been ſeen, it muſt firſt be turn'd over rough, and then plaiſter'd over, and marked with artificial Lines for Beds and Joints drawn to amuſe! Or elſe it muſt be ſet with a very ſtrong Cement, and placed only for ſhow, and the Span or Width very ſmall: Or, like the flat Arches by *Monſieur le Comte D'Eſpie*, whoſe Conſtruction depends entirely on the ſtrength of the Plaiſter, not on his flat Bricks. But they cannot be put in practice for Bridges, or for any other Works, where there is a great Preſſure: No Arch can ſtand without a Key in Stone, Bricks, or ſuch like Materials.

Observations on Mr. *Muller's* Elliptical Arch, in his Treatiſe on Practical Fortifications, &c.

In the Preface Page 10th, "It has hitherto been imagined, though without any Foundation, "that an Elliptical Arch is weaker, and preſſes the Piers with a greater force than a circular one. "The Reaſon which Authors pretend to give for this Suppoſition is, that all the Joints of a "circular Arch when produced meet in the ſame Point, without conſidering that all low "Arches require leſs Maſonry than thoſe which are higher."

The Strength of the Semicircular requires no better Illuſtration to convince this Author of its Superiority, than the Form (not the practical Work or Maſonry) deſcrib'd by Mr. *Emmerſon* in *Fig*. 307. And I muſt beg leave to inform him, it is not the Quantity of Materials, whether more or leſs; but it is the Make or Shape of the Arch-Stones that forms the Curve. Beſides, in the Semicircular, the greateſt Preſſure falls on the Haunches, which keep the Arch ſecure on the Crown: But in an Ellipſis, there is certainly greater Preſſure on the Crown (eſpecially when Buildings are over them) than the Semicircular, as it is longer and flatter on the Top; therefore an Ellipſis cannot reſiſt the extraordinary Preſſure that the Semicircular will bear; and therefore may ſpring in the Haunches, which is the weakeſt Part, but in the Semicircular it is the ſtrongeſt: And the further you extend the Center below the Chord or ſtraight Line of an Arch, the weaker it will be, as in the Ellipſis, becauſe the Joints or Beds will be nearer to a parallel, as I before obſerv'd.

A Segment of a Circle the ſame Height as an Ellipſis, is ſtronger than the Ellipſis, if the Stones are drawn from the center point of a Semidiameter, and will have leſs Preſſure on the Piers, they being nearer to the Line of the lateral Preſſure, therefore will truſs with great force againſt the foot of each other, and throw their whole Preſſure on the Center or middle of the Pier, which cannot be the caſe in the Ellipſis.

Again, (ſee Page 63) "The erroneous Notions of other Authors, who have looked up- "on the circular one as the ſtrongeſt and the beſt, without being able to give any other Reaſon "than becauſe all the Joints meet in the ſame Point, not conſidering that the ſame thing is ſo "in all Arches made of parts of Circles"—I hope he does not mean in the Ellipſis: If he does, that I deny, and muſt inform him, that his Aſſertion is erroneous. If an Arch is drawn from different Centers its Curvature varies, therefore the Moulds or Patterns muſt be made by

Lines drawn from each Center, not from one as in the Semicircular. For I preſume, if he was aſk'd, how I ſhould find a central Point for the forming the Arch-Stones in a Semicircular one, he would order me to take it from the central Point on the baſe Line : If ſo, then why ſhould not I take it from the two central Points on the baſe Line in the Ellipſis? If they were all taken from the lower Center, their Bearings would be imperfect, for their Joints muſt all meet in the ſame Points they are drawn from, and you may as well take a central Point conſiderably below or above the Chord or ſtraight Line in a Semidiameter, and by ſuch wrong Points you may make the Semicircular Arch to fall as ſoon as the Center on which it is ſet is taken away from under it. Falſe central Points will cauſe falſe and unequal Preſſures and Bearings.

I SHALL here make an Obſervation or two on this Author's Remarks on *Weſtminſter Bridge*. In the firſt Place he tells you, "That this Bridge, (Page 64th) is ſo very high, that it is with the utmoſt difficulty, that heavy loaded Carriages can get over it." Page 259, "I ſhould be glad to know how far this Deſcent may be carried, ſince it is plain, that the Slope of *Weſtminſter Bridge* is too much by a good deal, according to the beſt Judges; for the Beauty of any Bridge conſiſts, in that one may ſee from one End to the other, like a Street." Page 265, "Two Drains or Gutters are made lengthways over the Bridge, one on each ſide next the Foot-Path, of about ſix Feet wide, and a Foot deep; which being filled with ſmall pebble Stones, ſerve to carry off the Rain Water that falls on the Bridge, and to prevent its filtering through the Joints of the Arches, as often happens. Again, For when the Water paſſes thro' the Joints of the Arch-Stones, as it does at *Weſtminſter-Bridge*, it has an ill effect to the Eye, becauſe thoſe Stones that are wet, look of a black Colour, &c."

I AM of opinion, this Critick deals only in hearſay. There's no doubt but the ingenious Mr. *Labely* had a juſt reaſon for the Aſcent and Deſcent he has given it; for 'tis plain, that by ſuch proportionable Riſe it would appear noble and graceful: beſides, ſuch a Fall is the only means to keep it dry and carry off the Water, which would otherwiſe ſink into the Haunches, and alſo filter through the Joints of the Arches. But he ſays, "the Beauty of any Bridge conſiſts, in that one may ſee from one End to the other," which (without Buildings erected on it) would look flat indeed, eſpecially in a Bridge of 1220 Feet long. I would only aſk, which is the moſt eaſy for heavy loaded Carriages to be drawn over? A Bridge that is dry with a Fall as at Weſtminſter, or, the drawing ſuch Loads through a Slough, as muſt be the caſe, if he can ſtand at one end and ſee the Ground at the other: And, whether the Water will not filter through his more than Mr *Labely's* Fall? How is the Water, after a ſudden Thaw, &c. to be carry'd off a Bridge of ſuch extent? I anſwer, not with ſuch a Fall as he recommends, "ſo that you can ſee the Ground at both Ends, or with Drains or Gutters fill'd up with ſmall Pebbles (ſix Feet wide and one Foot deep) made length ways over the Bridge."

I WISH this Author had kept his Language within the Bounds of Candour, and not ſet ſo great an Eſtimation on his own Abilities, by attempting to leſſen the Reputation of Men of real Merit.

I SHALL now offer ſome Obſervations relating to the Appendages or additional Supports to Arches, wherein Art may be made uſe of for their Security.

THE Semicircular wants no addition in the Arch itſelf, but 'tis very neceſſary to have a ſtrict regard for the Security of the Spandrels and Haunches, and the Abutments cannot be too ſtrong. The overloading the Crown and ſlighting the Spandrels and Haunches may endanger this, or any other Curve. Therefore all Arches muſt be well ſecured at the Foot, and to ſave Expence, Rouble-work may be apply'd (though in general miſapply'd, being put where the Streſs of the Arch lies.) Therefore I have given a Section of the Inſide-work, wherein I have drawn a rough

Arch *O*, extending itſelf unto the middle Arch-Stone on the ſide mark'd *L*. This, I preſume, will ſecure the Rouble-work, and keep the Arch in its Center. As for Arches revers'd in the Spandrels of a Bridge, I think they can be of no uſe; but in the Foundation of a Building under the Voids, they are very neceſſary to keep the Building in Equilibrio. For their Preſſures being unequal, you muſt obſerve, that there is the weight of one, two, three, or more Stories to keep the foot of each of them in their Places; for which reaſon the Crowns muſt naturally ſink equally with the reſt of the Foundation. But in their Conſtruction on the Spandrels, &c. of a Bridge, there does not appear a ſufficient Weight on the foot of this counter Arch, to reſiſt the Preſſure, which will be upwards, eſpecially againſt an Arch of a large Extent.

As to the Elliptical Arch, we are not to ſuppoſe it placed on a Rock: were it ſo indeed, it wants no Aid, only great Care is to be taken of the Spandrels and Haunches, (the Abutments, as I before obſerv'd, cannot be too ſtrong:) But where it is placed on a ſoft Bottom, and ſubject to Torrents, or the flux and reflux of the Tide, a little Addition of Art would not be amiſs.

CONCERNING a Propoſal for an additional Strength to the Elliptical Arch, Mr. *Marter* delivers his Opinion thus: (*a*)

"THE Joggles, propoſed to be put in to keep the Arch-Stones from ſliding by each other, "and by that means to take off $\frac{3}{50}$ of the weakneſs of the Elliptical Arch, and ſaid to be of (*b*) "a new Invention, I believe, have not been ſo well conſidered as they ought to be. I apprehend theſe Joggles to be expenſive and to add no ſtrength.

JOGGLES properly plac'd, whether wrought on the Arch-Stone, or a piece of Stone proportionate to each let into them, about ſix Inches thick, being three Inches into each, ſee *Fig.* 4th, are far better for the ſtrengthening of a weak Arch, becauſe no Arch-Stone can ſlide from them, where they are introduced; beſides, their extending into each other further than the top of each Arch-Stone, makes it ſo ſtrong, that no juſt Calculation can be aſcertain'd of the ſuperior Strength. If it was ſo to happen, that the Preſſure of each Bed or Joint was taken off, the Joggles would ſupport the Arch from falling, where the Preſſure is not too violent, and they are not ſo expenſive as may be imagined.

THIS Method is far preferable to the driving Wedges of Iron* into the top of the Joints, which Project appears to me to be very ill judged. For when the Arch is ſet on the Wood Center, it ſhould not be confin'd too cloſe on the upper part towards the Crown; for on ſtriking, or taking down the Center, there are very few Arches but will ſettle a little, and by that means will throw an equal Preſſure of each Bed or Joint againſt each Arch-Stone: but if confin'd on the upper part of the Beds or Joints, and any Accident ſhould happen to the Piers or Abutments, the conſequence would be, that the Joints would open below, which will take off that Preſſure on each Bed, and throw the whole Force on the upper Ends of each Joint; and the Wedges would prevent the Stones cloſing againſt each other, ſo that the whole Dependance would be on the Iron Wedges. But as long as an Arch is well loaded on the Crown, and continues cloſe on the inſide, there is no danger of its falling, as the wider part of the Vouſſoirs or Arch-Stones cannot drop

through

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[a] Mr. *Marter's* Opinion—See London Magazine, March, 1760.

[b] Not new: For Joggles are often uſed in Maſonry to prevent Stones ſlipping from each other, as in the Joints of the Architrave over Columns in large Porticoes, &c. being ſimilar to ſtraight Arches.

[*] The Report of this Method being made uſe of, I hope, is entirely without any Foundation, as Clamour, and perhaps Prejudice may have ſpread its Wings abroad. Therefore I have given my Sentiments on that Practice, that the young Student may avoid it.

through the ſpace of the leſſer Ends. But if Iron Rails be placed over Arches to eaſe the Crowns, this would be taking off the very Preſſure that ſhould reſiſt the Preſſure from the Haunches.

NO general exact Rule can be given for the Proportions of Bridges, becauſe all Bridges have not their Foundations alike, and therefore muſt come under the various Conſiderations of their Lengths and Widths; Strength, Safety, Utility, and eaſe of Aſcending. Some Soils requiring large Foundations where there are ſmall Arches: Others, where they are built on Chalk, &c. leſſer Foundations, with large Arches. Where the Soil is inclining to be ſoft, the Arches ſhould not be too large, (I mean only where Piles are not uſed.) And laſtly, Care muſt be taken to proportion the Foundations ſo as to keep them and the different Preſſures of the Arches in a State of Equilibrium.

THE ingenious Mr. Simpſon, delivering his Opinion on the Strength of the Elliptical and Semicircular Arches for a * Bridge, mentions the Efforts of Arches to overturn their Piers. To this it may be reply'd — That if the Maſonry of the Piers be properly executed, and proportion'd to the Weights and Preſſures they are to receive, whether greater or leſs; — and if the Arches and Piers be ſo proportion'd as to have an equal Preſſure on the whole Foundation they are fix'd on,—they cannot be in danger of overturning. For, if the Bed of the River (though of equal Texture) ſhould not be able to ſuſtain the whole Preſſure, and the Arches on the Piers, together with their Foundations, (though calculated to be in a State of Equilibrio) ſhou'd ſettle, yet will they deſcend equally, and remain in a fix'd perpendicular State. But if Arches be ſo conſtructed, as to have a very unequal Preſſure, and the Bottom of the River be ſoft or defective, then there is a probability of the Piers ſettling more on one ſide than the other. As is the Caſe of an old § Stone Bridge, where the Center Arch is a Gothic one, 19 Feet wide; and the two leſſer ones are long Ellipſes, 17 Feet 8 Inches each. The Height from high Water to the Crown of the Center Arch is exactly double the Height of each of the Side Arches; and notwithſtanding the Piers are above $\frac{1}{3}$ of the Width or Opening on the Chord of the Center Arch, and the Ellipſis on the Chord or ſtraight Line about 1 Foot 10 Inches lower than the Chord of the Center Arch, yet each Pier is ſettled five Inches lower on the Sides † next to the Banks than they are next to the Center Arch; which proves that the Conſtruction of the Elliptical Arches was not ſufficient to reſiſt the Preſſure of the Center Gothic Arch, ſo as to keep the Piers in a perpendicular State.

AFTER the many Experiments and Calculations of Mathematicians, to prove the Strength of an Arch, they never thought of one of the moſt principal Parts, which is, the Piers. For inſtance: I think it has been a common Direction to Workmen and the Student, never to make the Pier in Thickneſs above one fourth of the Width of the Arch, nor leſs than one ſixth. But ſuppoſe a Pier to be placed, to receive the Feet of two Arches, the one 50 Feet in the Opening on the Chord or ſtraight Line, and the other about 42 Feet 6 Inches. Then, if the Foundation projects equally on each Side of the Pier, Quere, Whether the Arch 42 Feet 6 Inches is equal in preſſure on the Pier and Ground with the Arch 50 Feet, to be calculated according to the different Curves? This I would humbly recommend to their Conſideration. And in order to find out the true Preſſure, I would alſo recommend, to form a Model in Miniature, with Pieces of Wood, or ſoft Stone, and prepare them as directed at large in the Sections, (*Fig.* 5th,

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* For *Black Fryer's* Bridge.

§ St. *Oliave's* in *Norfolk*.

† Erected on an Oozy Soil.

Plate 60th) with a Pier between each of them out of a ſolid piece or pieces, placing the Ends on Blocks for Abutments, and ſetting the Piers on ſomething, that the Weight and Preſſure of the Apparatus will ſink into*. Such practical Experiment will enable us to form a more exact Judgment of the Strength and Preſſure of ſo many Tons weight, than a ſpeculative Diviſion and Subdiviſion upon Paper; or the chipping out the Stone of a large ſolid Block to form the Arch, See *Fig*. 6. and ſetting it on two Blocks and loading the Top, to prove its Strength: That will not prove it, neither is this an Arch in Maſonry, but a Curve or Arch Line; for this being without Flexibility, will break in the weakeſt Part, which is the Top: for 'tis impoſſible to break on the Sides, becauſe the Block is left ſolid. But where there are Arch-Stones, if any Wring or unequal Preſſure happen, they will naturally ſettle cloſe to each other, without its being viſible to the Eye. Now if two Blocks of equal Dimenſions were chipt out with a ſemicircular or elliptical Form, for a Bridge, Piazza, &c. and one end of each of them fixed together, ſo as to make one upright Joint in the middle on the top of the Pier that ſupports them and the other Ends on Abutments, then the upper Beds of the Blocks would be level. Suppoſe, that by loading or building on that upper Bed, the Pier ſhould ſettle with its Weight (as it is rare to find Buildings that will not) or ſhould ſink by ſome unexpected Cauſe: How would theſe two chipt-out Blocks and upright Joint act on that Pier?—Or how can the true Preſſure of an Arch of any Curvature be found in one Block of Stone?——I anſwer, it cannot be found at all, as it will not ſettle towards the Center of the lateral Preſſure, nor can ſpring in the Haunches. But an Arch with Arch-Stones will preſs towards the lateral Preſſure, or ſpring in the Haunches (as I before obſerv'd) becauſe of its being flexible. So that in an Arch of this latter Conſtruction, a more exact Judgment can be form'd of the Center of Gravity, Preſſures and Bearings, than from one made out of a ſolid Block of Stone. On Suppoſition that every part of an Arch was of equal Thickneſs, cut out of one Piece, and proportioned to the Opening for the Weights it is to receive, then, before it receive its Burdens proportionate to thoſe of Curves with Arch-Stones, it would break in more than one Part and fall, as Arches muſt receive various and unequal Preſſures. Where Arches with Arch-Stones are properly conſtructed, and on a Soil that can be depended on, even then, no exact Calculation can be made of their Weights and Preſſures: For we muſt conſider, that the very Materials apply'd are not of an equal Body, the Denſity of Stone being various. Therefore, in the Conſtruction of a Bridge, Piazza, &c. if they pretend to aſcertain the exact Weight and Preſſure to a Pound, Hundred, or Ton, they will be liable to frequent Miſtakes. Let them take a Piece of each of the following Stones, ſuppoſe 8, 10 Inches, or a Foot Cube of Portland, Bath, Ketton, or various other Stones from the North, &c. nay even a Piece from each of the different Beds of Portland—and weigh each of them; ſo may they detect the Uncertainty of their general Calculations, and perceive the ſuperior weight of Evidence from Experience grounded on Facts.

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* The following Method, I preſume, would anſwer for its Tryal. Take two or more Tin-Pans or Wood Boxes, according to the Number of Piers, to be longer and wider than your intended Foundation; and to be made a proportionate Depth according to the Size of the Model. Fill theſe Pans with Pipe-Clay well beaten and tempered; and with a ſtraight Rule ſtrike it off level with the top Edge of your Pans. Around the inſide Edge make a Trench to the Bottom, and let it ſtand 'till it become ſtiff. Then place your Piers on them, and fix them in their proper Place, taking care that the whole Apparatus when put together be exactly level on the Clay. When done, keep tempering your Clay by ſlow Degrees with an equal Quantity of Water in each Trench. This will diſcover a true Preſſure: by the ſinking of the Piers into the Clay, and by moiſtening it gradually, you may form ſome Judgment of its Effects on a Chalk Bottom, a Gravel, and an Ooze. By this Method, you will diſcover how far a Pier will ſink before the Arch will fall in: and if you put the whole Apparatus together dry and without any thing in the Joints, you will ſee how every part will act when it is ſinking, by the opening or cloſing of the Joints. Alſo, if one part of the Foundation for a Pier of a Bridge is a Gravel, and the other inclining to be looſe and ſandy, by putting a larger Quantity of Water into your Tin Pan for the Sandy Bottom, than you do for the Gravel, you may form a Judgment of the different Preſſures on each Bottom, and what Proportion will be neceſſary for the Foundation on the Sandy Soil, to keep the Pier in Equilibrio with the Pier on the Gravel; and will alſo diſcover the true Preſſure of the Arches of different Dimenſions on one Pier.

When the Mathematician has by his Calculations form'd an Arch which he imagines to be the ſtrongeſt, let him make or cauſe to be made a Model or Apparatus as deſcrib'd, whether from one or more Centers; and by tempering the Clay, he may diſcover whether his Calculations will anſwer with the Actions of the Apparatus, and what Weight ſuch Arches are able to bear for the different Soils.

N. B. The Lead for the Parapet is to ſerve each Model, which will prove the different Preſſures of the Semicircular, Ellipſis, &c. with the ſame Weight.

THUS have we ſeen the Neceſſity for Arch-Stones, which will always ſupport themſelves with their Burdens, where the ſinking of the Piers is not very conſiderable: But no Arch with Arch-Stones can ſtand, without ſome proper Foundation.

I HAVE alſo given an Elliptic Arch, which comes nearer to the Semicircle with its Dimenſions. See *Fig.* 4.

I SHALL conclude with a Remark, omitted in the former part of this Work. * Mr. *Emmerſon* ſays, "A Circle, it is very true, is very eaſily deſcrib'd, and that may be one reaſon for making uſe of it."——This ſeems to imply, That the Antients were ignorant of the Conſtruction of any Arches except the Semicircular, becauſe they conſtantly practiſed this; whereas I rather account for it thus.

THE Origin of Science was from natural Ideas; and when the Semicircular Form of an Arch was introduced, no doubt but it was adjudg'd to be the ſtrongeſt, on account of its eaſy Bearings, requiring no Aid or Embelliſhments to add to its Beauty or Strength. There want no new Proofs of the maſterly Skill of the Antients, as ſufficient Monuments remain to teſtify their noble Taſte, not only in Architecture, but in Sculpture, Painting, &c. and even in Geometry; though the inceſſant Revolutions and Depredations of Time may have depriv'd us of many of their moſt valuable Works. If in thoſe Ages of Simplicity and natural Knowledge, they arrived to ſo great a pitch in Architecture, Sculpture, and Painting, &c. there's no doubt but the Geometricians were as eminent; ſince all real Science is equally founded on Nature and natural Proportions. But Manuſcripts are form'd of leſs durable Materials than Marble or Braſs. The *Greeks* and *Romans* built for ſucceeding Ages, as being conſcious that their Models would be the Admiration of all Poſterity. But though this enlighten'd Age has thoſe noble Originals to copy from (a great Advantage) yet, inſtead of endeavouring to improve upon them, we are fond of every childiſh gaudy Toy. And thus it muſt be, while we neglect to ſtudy Nature, and prefer the Illuſions of Fancy to the Dictates of ſolid Judgment.

THE Remarks I have made in this Tract, I hope will be acceptable to every impartial Judge; and likewiſe tend to form the Ideas of the young Student by the moſt familiar Method of Illuſtration. And if what I have offer'd ſhould meet with any ſevere Criticiſm, I have the Conſolation to know, that if call'd upon, I can apply theſe eaſy Principles to Practice.

AN
EXPLANATION
TO EACH
PLATE.

PLATE I. THE Plan and Elevation of a ſmall Building 30 *ft.* in front by 28 *ft.* deep. The Rooms are divided in the following manner.

a, Paſſage
b, Parlour
c, Large Parlour
d, Stair-Caſe
11 *ft.* high.
e, Cloſet
f, Pantry
k, Kitchen

The Chamber Floor conſiſts of three Rooms, and Cloſets over *f* and *a* :—10 *ft.* high.

PLATE II. Another ſmall Plan and Elevation 30 *ft.* ſquare, divided in the following manner.

a, Paſſage
b, Parlour
c, Large ditto
d, Pantry
11 *ft.* high.
e, Scullery
f, Cloſet
g, Stair-Caſe
K, Kitchen

The Chamber Floor has one Room over *K*, with receſs for a Bed over *d* and *f*: two Chambers over *b* and *c*, and Cloſets over *a* and *e*.—10 *ft.* high.

PLATE III. Plan and Elevation of a ſmall Building deſign'd for a Summer-Retreat, to be placed on a pleaſing Eminence, and divided as follows.

a, Hall
b, Parlour
c, Stair-Caſe
d, Dining-Parlour
e, Door-way to Stair-caſe
ff, Cloſet and Scullery
g, Store-Room or large Pantry
h, Paſſage to
ii, two ſmall Lodgings for Servants.
K Kitchen

N. B. The Stair-Caſe is illuminated with Attic Windows oppoſite to each other. Over *b* and *d* are two Chambers, each Story being 12 *ft.* high, as alſo *a* and *K*.

PLATE IV. Plan and Elevation of a Building deſign'd to be ſituate near a City or Market-Town, for a Gentleman or Merchant, with the adjoining Apartments, extends 59 *ft.* in front, and divided as follows.

a, Hall and Stair-Caſe
b, *d*, Parlours
c, Dining-Room
e, Dreſſing-Room
f, Study
12 *ft.* high.
g, Back-Kitchen or Scullery
h, Pantry
ii, Cloſets
k, Cloſet to Dreſſing-Room
K, Kitchen

Note. If for a Merchant, *e* and *f* are Accompting-Rooms, the Communication to them at *k*.—The Chamber-Story conſiſts of three Rooms 10 *ft.* high, viz. over *b*, *c*, and *d*, and the Paſſage mark'd 4 is 5 *ft.* 6 *In.* wide, for a Stair-Caſe to the four Garrets, which are illuminated with Sky-Lights.

PLATE V. A Building deſign'd for a ſmall Family in a City or large Town. Its Front extends 42 by 33, and contains the following Rooms.

b,	Parlour	11 *ft.* high.	*e*,	Back-Stairs
a,	Hall		*g*, *g*,	Two large Cloſets
c,	Dining-Parlour		*K*,	Kitchen
d,	Stair-Caſe			

The upper Story 10 *ft.* high, conſiſts of three Chambers over *b*, *c*, and *K*. Over *g*, *g*, are two Cloſets. Room over *a*, may be made a Dreſſing-Room. The Cellar Story 7 *ft.* 6 *In.* high to be apply'd to ſuch neceſſary Uſes as beſt ſuit the Inhabitant.

PLATE VI. The Plan and Elevation of a Building deſign'd for a City or Town: Its Front extends 46 *ft.* and conſiſts of the following Rooms:

a,	Hall and Stair-Caſe	12 *ft.* high.	*f*,	Small Scullery
b & *c*,	Parlours		*g* & *i*,	Cloſets
d,	Dining-Room		*h*,	Back-Stairs
e,	Cloſet		*K*,	Kitchen

The Cellar-Story 7 *ft.* 6 *In.* high. The Chamber-Floor 10 *ft.* high, conſiſts of the four Rooms over *b*, *c*, *d*, and *K*: over *e*, *f*, *g*, *i*, Cloſets. The Back-Stairs communicate to the Garret-Story, which conſiſts of 6 Rooms.

PLATE VII. The Plan and Elevation of a Houſe for a ſmall Family in a City, &c. 40 *ft.* 6 *In.* in front, and is laid out as follows.

a,	Veſtibule	12 *ft.* high.	*f*,	The Store-Room
b, *b*,	Two large Parlours		*g*,	Pantry
c,	Stair-Caſe		*h*,	Scullery
d,	Small Parlour		*K*,	Kitchen
e,	Back-Stairs illuminated from the Roof			

The Chamber-Floor, 10 *ft*, 6 *In.* high, contains five Rooms over *b*, *b*, *g*, and *h*, *K* and *d*, Dreſſing-Room. Over *a* and *f*, Cloſets. Only the Back-Stairs communicate with the Garret-Floor, conſiſting of 5 Rooms 10 *ft.* high.

PLATE VIII. A Plan and Elevation of a Building which extends 41 *ft.* in front, by 39 *ft.* 6 *In.* and is deſigned for a Gentleman who is center'd in a Row of Houſes two Stories high, being his own Eſtate. But his adjoining Neighbours may retain Shops in front, tho' it ſhould ſo happen that he is in want of additional Rooms, in order as little as poſſible to leſſen the Value of his Rentals. This Hint I have given, to take from the back part, and leave the Shops in front, to anſwer his Plan, and build as here laid out if the Ground will ſuit.

a,	Hall and Stair-Caſe	12 *ft.* high.	*f*,	Store-Room
b,	Keeping-Parlour		*g*,	Pantry
c,	Great Parlour		*h*,	Scullery
d,	Dining-Room		*ii*,	Cloſets
e,	Back-Stairs		*K*,	Kitchen

The Chamber-Floor conſiſts of 4 Rooms, 11 *ft.* high, *b*, *c*, *K*, and *f*, which laſt is a Dreſſing-Room. The Garrets have no other going to but by the back Stairs, and they conſiſt of four large Rooms; or the Room over *a* and *f* may be divided into two, the whole being 9 *ft.* high.

PLATE IX. The Deſign of a Building for a ſmall Family in a large Town, which extends 54 *ft.* in front, and is laid out as follows.

a,	Hall and Stair-Caſe	12 *ft.* high.	*f*,	Back Stairs
b, *c*,	Parlours		*g*,	Paſſage
d,	Dining-Room		*h*,	Pantry
e,	Paſſage from Kitchen to Parlours, illuminated by the 3 openings with Arches & Stair-Caſes		*i*,	Cloſet
			j,	Scullery
			K,	Kitchen

The Chamber Floor is 11 *ft.* high, and contains five Rooms over *b*, *c*, *d*, *K*, over *i* and *h* is a Dreſſing-Room, and *j* a Cloſet. The Communication over *e* is illuminated with three Openings as below, with Baniſters at each end-opening. The Garret Floor is 9 *ft.* high, and contains a Landry and five Lodging-Rooms, having only the back Stairs to them, and being illuminated with Sky-Lights on the ends of the Roof.

N. B. The Bow is carried no higher than the Parapet.

PLATE X. Is a Deſign for a Building 56 *ft.* in front, for a Gentleman or Tradeſman in a City or Market-Town, or on a Spot where there is a Plan of an old Building of the ſame external Form.—The Rooms are divided as follows.

a,	The Hall divided from the Stair-Caſe with 3 Openings ſupporting the Landing	12 *ft.* high.	*e*,	Paſſage
b,	Small Parlour		*f*,	Back Stairs
c,	Great Parlour		*g*,	Back Kitchen
d,	Dining-Room		*h*, *h*,	Pantry and Cloſet
			i,	Cloſet to Kitchen and little Parlour
			K,	Kitchen

PLATE XI. Is the Chamber-Plan and Garden-Front to the foregoing Plate: the Rooms as follow.

k's	Paſſage and landing to Stair-Caſes	11 *ft.* high.	*m*,	Dreſſing Room
l, *l*, *l*, *l*,	Four Bed-Rooms		*n*,	A Cloſet

Over *k's*, *n*, *m*, are 3 Rooms for Garrets, as dotted, 10 *ft.* high. Communication by back Stairs *o*.

PLATE XII. Is another Deſign with a leſs Court for a Gentleman or Wine-Merchant, in a large Town, &c. the Front extending 69 *ft.* 6 *In.* The Rooms are prepared for the following Uſes.

a,	Hall and Stair-Caſe	12 *ft.* high.	*f*,	Study or Compting-Room
b,	Keeping Parlour and *x*, Cloſet		*g*,	Back Stairs
c,	Great Parlour		*h*,	Scullery
d,	Dining-Room		*i* & *j*,	Pantry and Cloſet
e,	Store-Room		*K*,	Kitchen

N. B. The Cellar Story, 8 *ft.* high, to be vaulted for the Reception of Liquors. The Cells I would recommend to the Direction of the Proprietor, as knowing what will beſt ſuit his Conveniency.

PLATE XIII. Is the Chamber Plan of the Garden Front to the foregoing Plate.

l, *l*,	Landings	10 *ft.* 6 *In.* high.	*o*, *o*,	Small Lodging Rooms
m, *m*, *m*, *m*,	Four Bed Rooms		*p*,	Landing to back Stairs
n,	Dreſſing-Room		*q*,	A Cloſet

The Garrets 7 *ft.* 6 *In.* high, have only Sky-Lights, and are to be partitioned off as the Owner thinks proper for the Convenience of his Family.

PLATE XIV. The Plan and Elevation of a Building, which extends, with the adjoining Apartments, 100 *ft.* in front; to be ſituated on an agreeable Spot in a City or Villa: The Rooms deſign'd as follows.

a,	Hall	15 *ft.* high.	*i*,	Store-Room
b, *c*,	Parlours		*l*,	Butler's Pantry
d,	Dining-Room, with 2 Niches for Tables		*m*,	China, &c. Room
e,	Withdrawing-Room		*K*,	Kitchen
f,	Stair-Caſe		*n*,	Pantry to Kitchen
g,	Back Stairs		*o*,	Back Kitchen
h,	Study		*m*,*m*,	Two Cloſets

N. B. Servant's Hall and the other requiſite Conveniencies in the Cellar Story, 9 *ft.* high: the going to them is under the Stairs, *g*.

The Chamber Floor conſiſts of the following Rooms, 12 *ft.* 6 *In.* high. Over *a*, is a Lodging Room and two Cloſets as dotted: *b*, Dreſſing-Room: *c*, *d*, *e*, Lodging Rooms: 10, is a landing to both Stair-Caſes. Only the back Stairs lead to the Garrets, which are ſix in number, over the two large *d* and *e* are three Lodging Rooms, 9 *ft.* 6 *In.* high.

PLATE XV. Plan and Elevation of a Building for a Gentleman with a middling Family. (It often happens in a City or Town that the Ground is lower on the back ſide than the front: I have therefore placed the Kitchen (under *d*,) Pantry and Conveniencies 10 *ft.* high, level with the Ground on the back or Garden front.) The principal Rooms are divided as follows.

a,	Hall	12 *ft.* high.	*e*,	Withdrawing Room
b,	Parlour		*f*,	Study
c,	Eating Parlour		*g*,	Stair-Caſe
d,	Dining Room		*h*,	Back Stairs

PLATE XVI. The back or Garden front and Chamber Floor to the foregoing Plan, as follows.

i's	Are Paſſages to each Room	11 *ft. high.*	*l*,	Dreſſing Room
j, *j*,	Cloſets		*m*,	Small ditto, or large Cloſet
k, *k*, *k*, *k*, *k*,	Five Bed Rooms			

Note, There are the ſame number of Rooms and Cloſets on the Garret as the Chamber Floor, being 9 *ft.* high.

PLATE XVII. A Deſign of a Building for a Gentleman of opulent Fortune, adapted for a City or Villa, 80 *ft.* in front. The Ruſtic or Baſement Story I propoſe to be 9 *ft.* high, and by deſcending 2 *ft.* that there might not be too many Steps to the principal Floor, and are deſign'd only for Offices, for the Servant's Hall, Pantry, &c. and Cellars under *f*, *g*, *i*. The Kitchen is to be at ſome ſmall Diſtance from the Manſion, communicating by a ſmall Arcade. The Apartments on the principal Floor as follows.

a,	The Hall and Stair-Caſe 25 *ft.* cube	15 *ft.* high.	*f*,	Withdrawing Room
b,	Parlour		*g*,	Dreſſing-Room
c,	Eating Parlour		*h*,,*h*,	Bed Rooms
d,	Library or Study		*i*,	Back Stairs illuminated from the Roof,
e,	Dining-Room (with a cove Cieling, 20 *ft.* high.) Vide Section			

The upper Story 10 *ft.* high, and to be divided into 7 Rooms over *b*, *c*, *d*, *f*, *g*, *h*, *h*: a ſmall Stair-Caſe over 8 to *e*, which *e* is divided into two Lodging Rooms for Servants. I propoſe no Rooms in the Roof: If there are, to be lighted with Sky-Lights in the Valley.

PL. XVIII. Elevation and Section to the foregoing Deſign.

PL. XIX. Is a Plan for a Perſon of Quality's Manſion in a Town or Villa: The Area of the Rooms in front extends 130 *ft.* long: The Ruſtic or Baſement Story, 10 *ft.* high, is divided into a number of Rooms for the Conveniencies of the principal Servants. The Kitchen and Conveniencies belonging thereto are to be detached at ſome diſtance with a Colonade adjoining to the Manſion, in order to prevent Steams and Heats aſcending into the principal Apartments, which would be very incommoding.

The Rooms on the principal Floor are diſtributed as follows.

a,	Hall	20 *ft.* high.	*h*,	Cloſet
b,	Saloon		*i*, *i*,	Stair-Caſes lighted from the Roof
c, *c*,	Withdrawing Rooms			
d, *d*,	Parlours		*k*,	A ſmall Stair-Caſe up to Dining Parlour and Side-board
e,	Dining Parlour			
f,	State-Bed Room			
g,	Dreſſing-Room		*l*, *l*, *l*,	Picture-Gallery

In the Attic Story are the ſame number of Rooms, only with an Addition, viz. The middle Room over the Gallery is to be divided into three Rooms, and *f* and *h* into two, deducting room for ſmall Stair-Caſes into the upper Rooms over *l*, *l*, *l*, and *e*, *f*, *g*, *h*, which run through, and alſo communicate to the two Roofs, which are lighted from Sky-Lights in the Inſide.

N. B. I have not introduced a Library, but propoſe a ſpacious one to be erected, with a communication by a Colonade, to anſwer the Kitchen-wing.

PLATE XX. Elevation to the foregoing Plan.

PLATE XXI. Is a Deſign for a ſmall Parſonage, 35 *ft.* in front, by 20, conſiſting of the following Apartments.

a,	Veſtibule	11 *ft.* high.	*d*,	Stair-Caſe
b,	Keeping Parlour		*e*,	Study
c,	Beſt Parlour			
f,	Back Kitchen	9 *ft.* high.	*i*,	Cloſet
g,	Pantry		*K*,	Kitchen
h,	Stable			

In the Chamber Story are two Chambers over *b*, *c*, and Cloſet over *a*. Moreover, *e*, *f*, *g*, *h*, *i*, *K*, is a Lean-to, and by raiſing the Walls over *f* and *K*, may be made ſmall Lodging Rooms, aſcended by Steps off the Landing to Stair-Caſe.

PL. XXII. Is another Parſonage, 31 *ft.* by 29 *ft.* and divided as follows.

a,	Paſſage and Stair-Caſe	10 *ft.* high.	*c*,	Large Parlour
b,	Parlour		*d*,	Cloſet
			e,	Study
f,	Back Kitchen and Stair-Caſe	9 *ft.* high.	*b*,	Stable
g, *g*,	Cloſets		*i*,	Chaiſe-Houſe
			K,	Kitchen

The Chamber Story conſiſts of two Lodging Rooms and Cloſets over *a* and *d*, 9 *ft.* high. Over *f*, *g*, *g*, *K*, are two Lodging Rooms.

N. B. If the Stair-Caſe *a* is continued, there may be a Room in the Roof,

PL. XXIII. Is a Plan and Elevation for a Parſonage or Summer Retreat, the Front of which extends 34 *ft.* by 32 *ft.* wide, without the Offices, and divided as follows.

a,	Veſtibule	11 *ft.* high.	*d*,	Study
b,	Parlour		*e*,	Store-Room
c,	Beſt Parlour		*f*,	Stair-Caſe
g,	Paſſage to Kitchen	10 *ft.* high.	*m*,	Small Cloſet
K,	Kitchen		*n*, *n*,	Stables
b,	Scullery		*o*,	Chaiſe-Houſe
i,	Paſſage to Cloſet and Pantry *b* and *k*		*p*, *p*, *p*,	May be open or cover'd with Lights on the Roof

The Chamber Story has three Chambers, 10 *ft.* 6 *In.* high, over *b*, *c*, *d*. Over *a* and *e* are two Cloſets. The Stair-Caſe is carry'd up to the Garrets in the Roof, where the Partitions may be adjuſted to the Convenience of the Inhabitant.

PL. XXIV. Is a Deſign for a ſmall Building to be ſituate in a pleaſant airy Villa, as a Retreat for a Merchant, &c. where diveſted of the cares of Buſineſs he may enjoy the Converſe of a few ſelect Friends. The Length of the Front without its Offices is 40 *ft.* by 34 wide, and laid down as under.

a,	Veſtibule and Stair-Caſe lighted from the Roof	11 *ft.* high.	*d*,	Dining Parlour
b,	Parlour		*e*,	Drawing Room
c, *c*,	Parlour and Cloſet		*f*,	A ſmall Study
g, *g*,	Paſſage	10 *ft.* high.	*k*,	Stairs to a Cellar
b,	Back Kitchen		*K*,	Kitchen
i, *i*, *i*,	Cloſets and Pantry		*l*,	Stable
			m, *n*,	Coach-houſe & Oat-bing, &c.

On the Chamber Floor, 10 *ft.* 6 *In.* high, are the four following Rooms, over *b*, *c*, *g*, *d*, *e*. Over *f* is a Dreſſing-Room, which ſerves *d* and *e*. Alſo a Cloſet over the *a* 12: and there are two Garrets, which run through over *a* and *f*, 9 *ft.* high.

PL. XXV. A Deſign for a Gentleman, which extends 90 *ft.* in front, or a Parſonage for one who enjoys a very valuable Benefice. The Rooms are delineated as under, viz.

a,	Veſtibule	13 *ft.* high.	*g*,	Stair-Caſe
b, *b*,	Parlours		*h*,	Back Stairs
c,	Study or Library		*i*,	Store Room
d,	Dining Room		*K*,	Kitchen
e,	Receſs for Sideboard & Cloſet to ditto		*l*,	Pantry
			mm,	Cloſets
f,	Paſſage		*n*,	Scullery

The reſt of the Conveniencies are on the Cellar Floor.

The Chamber Story, 12 *ft.* high, conſiſts of 3 Rooms over *b*, *b*, *c*. Over *i*, Dreſſing Room, *a* and *f* Cloſets.—The Stair-Caſe riſes only to one Story: The Back Stairs communicate to the Garrets, which conſiſt of two Rooms over *b*, *b*, and Cloſet over *a*: alſo over *c* are two Rooms; and two ſmall ones over *i* and beſt Stairs.

N.B. The Wall-Plate to lay 9 *In.* below the Coping to Parapet.

PL. XXVI. A Plan and Elevation of a Building which extends in front 40 *ft.* by 38 *ft.* wide, without the Offices, deſign'd as a Summer Retreat for a Gentleman with a ſmall Family. The Diſtribution of the Apartments is as follows.

a,	Paſſage	12 *ft.* high.	*e*,	Stair-Caſe
b, *b*,	Parlours		*f*,	Paſſage
c,	Dining-Room		*g*,	Store-Room lighted from the Roof
d,	Drawing-Room			

h,	Scullery	10 *ft.* high.	*m*,	An occaſional Paſſage
i's,	Pantry and Cloſets		*n*,	Stable
k,	Dreſſing-Room		*o*,	Coach-Houſe
l,	Cloſet		*p*, *p*,	Courts

The Cellar Story 8 *ft.* high. The Chamber Story 10 *ft.* 6 *In.* high, conſiſts of three Chambers, *b*, *c*, *d*. Over *a* is a Cloſet, and *b* 16 a Dreſſing-Room.

No Garrets are deſign'd in the Roofs, but Rooms are intended to be in the Wings over Kitchen and Coach-Houſe, &c.

PL. XXVII. Is a Plan and Elevation of a Building for a Gentleman of Family, which exends in front 39 *ft.* by 38 *ft.* excluſive of the Offices: The Diſtribution of the Apartments as follows.

a,	Hall	12 *ft.* high.	*d*,	Great Parlour
b,	Parlour		*e*,	Paſſage
c,	Dining-Room		*f*,	Stair-Caſe

g,	Study, with covered Cieling	10 *ft.* high.	*m*, *m*,	The Gardener's Apartments
h,	Paſſage to Kitchen		*n*,	Stable
i,	Scullery		*o*,	Coach-Houſe
k, *k*,	Cloſets		*p*,	Harneſs-Room and Stair-Caſe
l,	Store-Room with a Sky-Light			

p, is a Paſſage into the Cellar Story, which is 8 *ft.* high, leading to the Servants' Hall, Store-Room, &c. and to the Stair-Caſe *f*.

Chamber Floor 12 *ft.* high, conſiſts of three Chambers over *b*, *c*, *d*, with a Dreſſing-Room over *a*: There are alſo Lodging-Rooms for Servants, &c. over the Kitchen Wing *i*, *k*, *k*, and Stables *o*, *p*.

PL. XXVIII. Is a Deſign 40 *ft.* by 36, for a Summer Retreat, to be ſituated on an Eminence commanding ſome extenſive Proſpects which may exhilarate and add freſh Vigour to the Mind of the wealthy and induſtrious Inhabitant.

a,	Hall	14 *ft.* high.	*d*,	Stair-Caſe
b,	Little Parlour		*e*,	Cloſet
c,	Dining-Parlour			

f,	Paſſage	10 *ft.* high.	*K*,	Kitchen
g,	Study		*m*,	Store-Room
h,	Paſſage		*n*,	Cloſets
i,	Back Kitchen		*o*,	Stable
k,	Pantry		*p*,	Stair-Caſe to Lodging Rooms over *q*, *p*
l,	Stair-Caſe to Lodging Rooms over *i*, *K*		*q*,	Coach-Houſe

The Chamber Story 11 *ft.* high : the Apartments divided into three Lodging Rooms, *a*, *b*, *e*, and Dreſſing-Room as dotted over *c*.

The Cellar Story 8 *ft.* high, and the going to be under the Stair-Caſe *d*.

PL. XXIX. A Deſign of a Houſe for a Gentleman or Merchant retired from Buſineſs, to be placed on ſome pleaſing Eminence in a healthful Soil, and commanding ſome agreeable Proſpects. The Apartments are laid out in the following manner.

a,	Veſtibule	12 *ft.* high.	*e*,	Stair-Caſe
b, *b*,	Parlours		*f*,	Paſſage to K
c,	Dining-Room		*K*,	Kitchen
d,	Withdrawing-Room		*l*,	Study
g,	Back Kitchen	10 *ft.* high.	*k*, *k*, *k*,	Cloſets
h,	Store-Room		*m*,	Stable
i,	Pantry		*n*,	Coach-Houſe
			o,	Coachman's Apartments

p, *p*, are two Yards.

The Chamber Story conſiſts of three Lodging Rooms, *b*, *c*, *d*, and Dreſſing-Room over *b* 12 : alſo Cloſets over *f* and *a*, 11 *ft.* high : The Stair-Caſe to be continued for Rooms in the Roof to be enlightened with Sky-Lights at each end. There are Lodging Rooms for Women Servants over *g*, *h*, *i*,—and Lodgings for Men over *o* and *n*. The reſt of the Conveniencies in the Cellar Story, 9 *ft.* high : a Communication to be under the Stairs, *e* and *k*.

PL. XXX. Is another Deſign of a Retreat for a Perſon of Quality or wealthy Merchant : The Rooms diſtributed as under.

a,	Hall and Stair-Caſe	15 *ft.* high.	*e*,	Withdrawing-Room
b,	Breakfaſting-Room		*f*, *f*,	Communication to each Wing
c,	Parlour		*g*,	Library
d,	Dining-Room			
h,	Scullery	11 *ft.* high.	*l*,	Stairs
i,	Store-Room		*m*, *m*,	Bed Rooms
K,	Kitchen		*n*,	Dreſſing-Room
k, *k*,	Cloſets		*o*,	Stair-Caſe

The Chamber Floor conſiſts of two Bed Rooms, and Dreſſing-Room over *b*, 13 *ft.* high. The upper Rooms in the Wings are Lodgings for Servants.—The Cellar Floor runs under the whole Building for all the reſt of the requiſite Conveniencies, Servants Hall, Pantries, &c. and communicates with each Stair-Caſe, *l*, *o*, 9 *ft.* 6 *In.* high.

N. B. Over *d* and *g* a covering of Lead.

PL. XXXI. A Plan and Elevation of a Building for a Gentleman in the Country, conſiſting of the following Rooms.

a,	Hall	13 *ft.* high.	*d*,	Dining-Room
b, *b*,	Parlours		*e*,	Stair-Caſe
c,	Drawing-Room		*f*,	Little Stair-Caſe
g,	Paſſage to Kitchen	11 *ft.* high.	*l*, *l*,	Two Sheds for Kitchen Uſes
h,	Scullery		*n*,	Paſſage
i, *i*,	Pantries		*o*,	Cloſet
k,	Store-Room		*p*, *p*,	Coach-Houſe
K,	Kitchen		*q*, *q*,	Stables
l,	Larder			

The Chamber Story conſiſts of four Bed Rooms, and Dreſſing-Room over *b* 15, 12 *ft.* high. The Garret Floor has two large Rooms over *a* and *d* : the reſt on each ſide lighted from the Roof with Sky-Lights. There are alſo Rooms over the Kitchen, &c. for Servants. The Roofs to *g*, 17, and *l*, *l*. *l*, are conceal'd, the Garden-Wall being carry'd the ſame height as the Walls over the two Doors. The Cellar Story 8 *ft*. 6 *In*. high, with the going to under the Stairs *f*.

N. B. The Court next *o* may be cover'd with *n* and *o*.

PL. XXXII. A Deſign of a Building for a Gentleman of Family and Fortune in the Country, to be erected on a pleaſant and healthy Spot. The Rooms are diſtributed as follows.

a,	Hall	14 *ft*. high.	*d*, *d*,	Parlours
b,	Breakfaſting-Room		*e*,	Elliptical Dining-Room
c, *c*,	Beſt and back Stairs		*f*,	Withdrawing-Room

g and *i*, Colonades and Paſſage to Library Kitchen and Store-Room

h,	Library	20 *ft*. high to the Roof.
K,	Kitchen	

k,	Small Stairs to Cellars	Lean-to's conceal'd below the Walls.
l, *l*,	Cloſets	
m,	Butler's Pantry	
n,	Scullery	
o,	Store-Room	
p,	Larder	
q, *q*, *q*,	Courts	

The Chamber Floor conſiſts of Bed Rooms over *a*, *d*, *e*, *f*: Dreſſing-Room over *d* 18, and Cloſet over *b*, 13 *ft*. high. The Garret Floor has the ſame number of Rooms over each, and one over the beſt Stair-Caſe, 9 *ft*. high. The Cellar Story 8 *ft*. 6 *In*. high, for Servant's Hall, &c. &c.

PL. XXXIII. Is another Deſign for a Gentleman in the Country. The Diſtribution of the Apartments as under.

a,	Hall	14 *ft*. high.	*g*,	Library or Study
b, *b*,	Parlours		*h*,	Dreſſing-Room
c,	Dining-Room		*i*,	Stair-Caſe
d,	Withdrawing-Room		*k*,	Paſſage to
e,	Stair-Caſe		*K*,	Kitchen
f, *f*,	Communication to the Wings		*l*,	Store-Room
m,	Stairs	11 *ft*. high.	*q*,	Cloſet
n,	Scullery		*r*,	Stable
o,	Servant's Hall		*ſ*, *ſ*,	Coach-Houſes
p, *p*,	Pantry and Cloſet		*t*,	Stair-Caſe

The Chamber Floor conſiſts of four Rooms over *b*, *b*, *c*, *d*: Dreſſing-Room and Cloſet over *a*: and a Cloſet over 8, in *c*, 13 *ft*. high. Alſo the ſame number of Rooms to Garret Floor, 10 *ft*. high.

N. B. Lodging Rooms for Servants over *g* in the Wing and Landry, and Rooms over *K*.

The Cellar Story 8 *ft*. high.

PL. XXXIV. Is a Deſign of a Houſe with four Fronts, the Area of the Rooms being 50 *ft*. ſquare, to be ſituated on a riſing Spot which commands an extenſive and agreeable Proſpect from every Front, and is divided as follows.

a, *a*,	Hall, &c.	13 *ft*. high.	*e*,	Study
b,	Saloon, lighted from 8 Windows on Gallery. vid. Section		*f*,	Stair-Caſe
			g's	Paſſages
			h,	Back Stairs
c,	Dining-Room		*i*,	Cloſet
d, *d*,	Parlours			

The Chamber Floor conſiſts of 6 Rooms, and a Cloſet over *i*, being 11 *ft.* 6 *In.* high, with Communications to each Room through *g*'s and to Stair-Caſe leading to the octagon Gallery over the Saloon: no Rooms in the Roof. The Chimnies are carried up in the four Corners of the Balluſtrade on the Roof. The Kitchen and other Offices are in the Cellar Story, 9 *ft.* 6 *In.* high.

PL. XXXV. Is a Section to the foregoing Plate.

PL. XXXVI. Is another Deſign of a Houſe to be placed on an Eminence. [As lofty Halls are often introduced, which generally ſpoil the Rooms over them, I have given one which has no Connection with the Rooms in the Chamber Story] (Vide Section). The Diſtribution as follows.

a, Hall 24 *ft.* high.

b,	Dining-Room	14 *ft.* high.	*f*, *f*	Small Parlours
c,	Drawing-Room		*h*,	Great Parlour
d,	Stair-Caſe		*i*,	Paſſage
e,	Paſſage		*k*,	Study
			l,	Cloſet

The Chamber Story conſiſts of two large Rooms over *b* and *c*, a Dreſſing-Room over *f*, *x*, and Bed Rooms over *f*, *h*, *k*: alſo a Cloſet over *l*, 13 *ft.* high. The two Stair-Caſes are carry'd up to Garrets 9 *ft.* high, over *b*, *c*, *h*, *k*. The Kitchen or Cellar Story is 11 *ft.* high, being divided into Apartments for the Conveniencies of the Family. The Stables, &c. in this and the laſt Deſign, are intended to be in a Bottom at ſome Diſtance from the Houſe, that the Proſpects may be obſtructed as little as poſſible.

PL. XXXVII. Section to the foregoing Plate.

PL. XXXVIII. A Plan and Elevation of an equilateral Triangular Building, each Side between the Towers being 100 *ft.* long (on the outſide) deſigned to command three Viſtos. [Having obſerv'd in ſome eminent Authors *, that this Figure is utterly rejected, as incapable of any tolerable Diviſion within, except into other Triangles, I have here endeavour'd to make ſome regular Diſtribution of it. How far I have ſucceeded in the Attempt, reſpecting Strength, Utility, and Figure, muſt be left to the Candid and judicious.] The Rooms are delineated as under.

a,	Hall	12 *ft.* high.	*f*,	Study
b, *b*,	Parlours		*g*,	A Water Cloſet
c,	Dining-Parlour		*h*,	Dreſſing-Room
d,	Beſt Stair-Caſe, illuminated from a triangular Roof of Glaſs in the Valley		*g*,*g*,*g*,	Cloſets
			i,	Back Stairs
			k,	Paſſage to
			l & *m*,	Houſekeeper's Apartments and Store-Room
e,	A ſmall Hall or common Entrance		*n*,	Butler's Pantry

The reſt of the Offices in the Cellar-Plan, 10 *ft.* high.

PL. XXXIX. The principal Floor to the foregoing Plate, conſiſting of the following Rooms.

o,	Dining-Room	15 *ft.* high.	*q*, *q*, *q*,	Lodging Rooms
p,	Withdrawing Room		*r*, *r*,	Dreſſing or Lodging Rooms
q x,	Beſt Bed Room		*ſ*, *ſ*, *ſ*,	Cloſets
r x,	Dreſſing-Room to ditto			

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* See *Ware's* compleat Body of Architecture, P. 303, *Chambers'* and other Dictionaries.

In the Attic Story are the ſame number of Rooms; and if *o*, *p*, *q*, are judged too large, they may be divided into two each, 10 *ft.* high. There are alſo Garrets in the Roof, the Floor of which lies lower than the Cornice, that the Windows may be conceal'd below the Parapet. Paſſages taken out, and Lights next to the Valley, for Communications to each Room. Chimneys to be carry'd up through the middle of the Roofs to Towers.

PLATE XL. Is a Plan of the principal Floor of a Building adapted for a Perſon of Quality. The Rooms are divided as follows.

a, Hall 40 *ft.* cube

b, Saloon *c*, *c*, Withdrawing Rooms *d*, State-Bed Room *e*, Dreſſing-Room *f*, Bed Room	20 *ft.* high.	*g*, Dining-Room *h*, A ſmall Ante-Room, or if there be a Partition as dotted, a Dreſſing-Room *i*, Stair-Caſe *k*, Beſt Stair-Caſe

The Chamber or Attic Story is divided into a number of Lodging Rooms; that over *b* divided as dotted; no Garrets over *a*, nor in the Roof, but Rooms to be provided in the Wings or additional Apartments. The Baſement Story to be 11 *ft.* high, and is laid out as follows. Under *a* is a Hall and a Paſſage that leads to each Stair-Caſe: *b* Library: *c*, *c*, Parlours: *d*, Dining-Parlour: *e* and *k*, Houſekeeper's Store-Room and Apartment: *f* is a Room for upper Servants: *g*, Steward's Accompting-Room: *h*, Butler's Room: A Paſſage to be taken out of *g* into the Kitchen-Wing. The Cellar under them to be vaulted.

PL. XLI. Elevation to the foregoing Plan.

PL XLII. Is a Deſign for a ſmall Banquetting-Room 15 *ft.* high at the Termination of a Walk, with three ſmall Roofs no higher than the Top of the Parapet; or it may be cover'd with Lead, if this be not thought too expenſive.

PL. XLIII. Is a Plan for a Banquetting-Room at the end of a Walk, whence you have the command of ſome extenſive and pleaſing Proſpects.

a, Semicircular Portico
b, *c*, Side-Boards
d, A Landing and Stair-Caſe into the lower Story, which may be divided into Apartments for requiſite Uſes, as a Kitchen, &c.

PL. XLIV. Elevation and Section to the foregoing Plan: The Room is deſign'd to be 20 *ft.* high

PL. XLV. Is a Deſign for a Perſon of Quality, of an octangular Church, being 45 *ft.* internal Diameter, to be placed on an Eminence at a ſmall Diſtance from the Manſion, for the uſe of his Family, and a Pariſh that has but few Inhabitants; to be finiſh'd with a Cove-Cieling 30 *ft.* high.

PL. XLVI. Is a Deſign of an octangular Church or Chapel, 75 *ft.* the internal Diameter.

a, Two Stair-Caſes leading to the Galleries, which are ſupported with the eight Columns that ſupport the octagon Doom, 55 *ft.* high.
b, *b*, Veſtries
c, Communion Table, and no Gallery over it.

N. B. This Deſign was drawn in the Year 1753, for a Diſſenting Congregation in *Norwich*, but was thought too expenſive, and was therefore reduced to 60 *ft.* within, having a very plain Outſide. It is a very advantageous Structure for Hearing, notwithſtanding the Objections made to the Figure by Mr. *Morriſs*, in his Work entitled *Select Architecture*. There may indeed be ſome Reaſon to object againſt his Sketch, wherein the Arches are to be ſupported with large angular Jambs forming an Iſle or Paſſage round them, which may cauſe a confuſed Reverberation of the Voice interrupted by the Piers: But this will not be the caſe where Columns are introduced.

PL. XLVII. Is another Deſign for a ſmall Church or Chapel 50 *ft.* Diameter within, and 32=6 to the Center of the Dome, which is ſupported by eight Columns.
a, The Altar
b, The Portico
On the Outſide is a Stair-Caſe which leads into the Family Vault under *a*. [Vide Section, with Receptacles for each Coffin.]

PL. XLVIII. The Weſt End and Section to the foregoing Deſign.

PL. XLIX. Are the Half of two Deſigns of Small Chimney-Pieces.

PLATE L. Are two ditto.

PLATES LI, LII, LIII, LIV, LV, LVI, LVII, are Chimney-Pieces of various Finiſhings, with Profiles. There are no Scales to them, becauſe they muſt be made to the Openings ſuitable to their reſpective Rooms.

PL. LVIII. Is the Maſonry of the Semicircular Arch.

PL. LIX. Are two Elliptical Arches.

PL. LX. Are three different Apparatuſes to try the Strength and Preſſures of Arches

AS FOLLOWS.

A and *B*, Are Blocks for Abuttments
C's Are Pieces of Wood or Stone by which the Arches are form'd: the Length of each being the Breadth of the Bridge or Arcade, &c.
D's Are ſolid Pieces for Piers
e's Are Pieces laid on each other for Foundations
f's Beds of temper'd Clay
g's Are Tin-pans or Wood-Boxes to receive Water
H's Are Pieces of the ſame Length as the Arch-Stones
The Heights regular
The Lengths *l*, *l*, no exact Rule for them
I's Are Pieces of Lead
K's Are three chipt out Blocks

FINIS.

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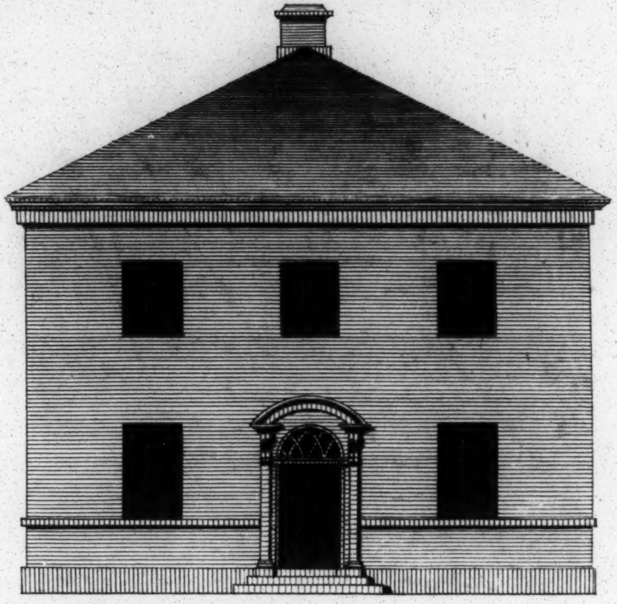

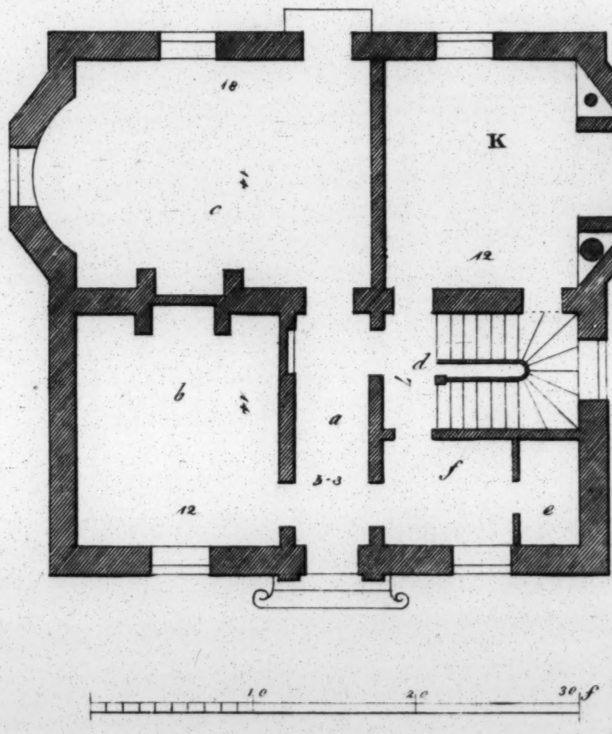

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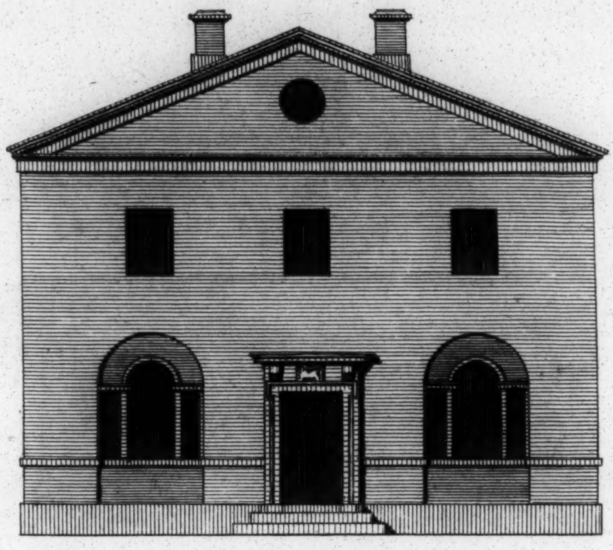

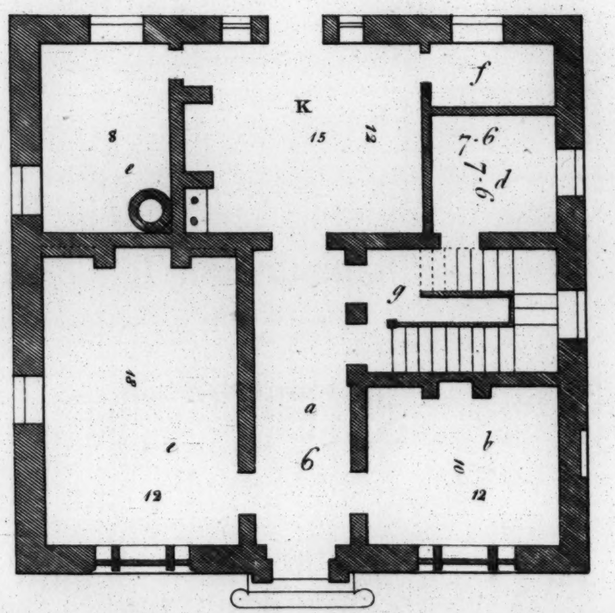

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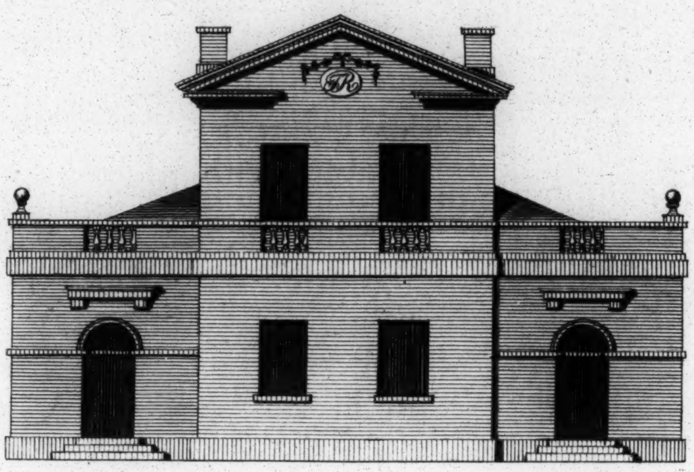

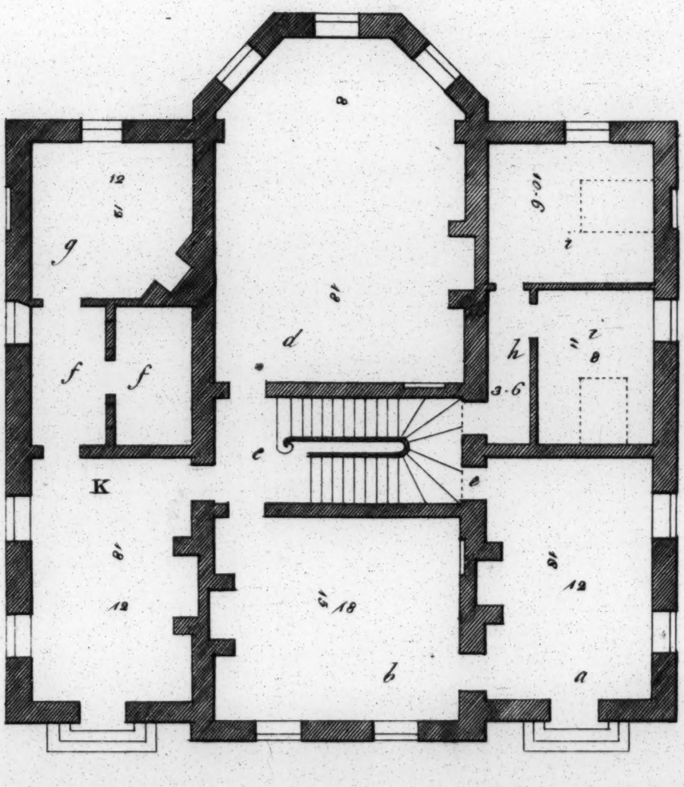

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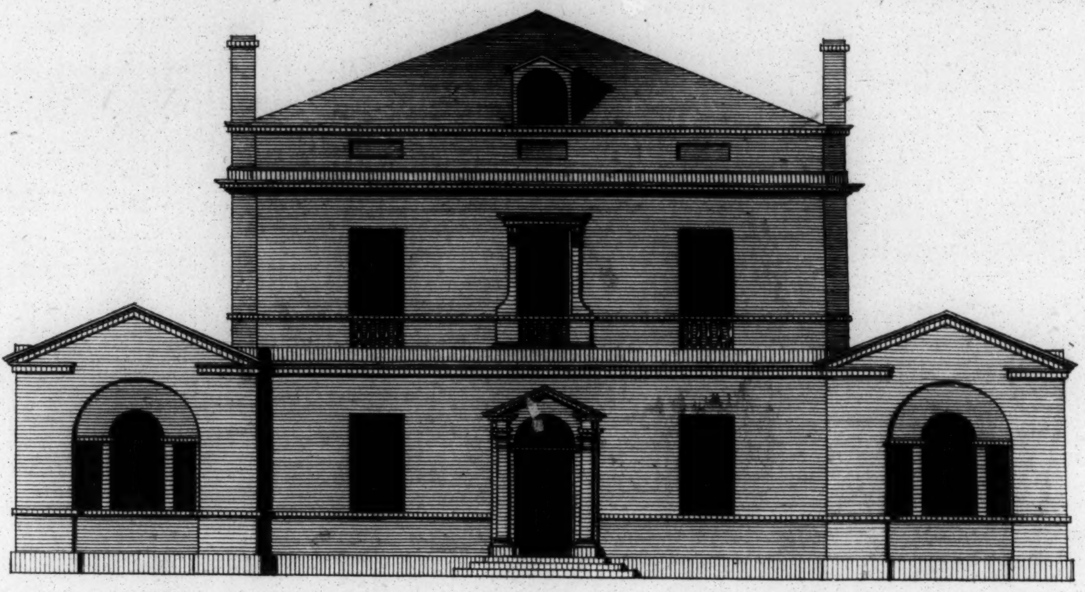

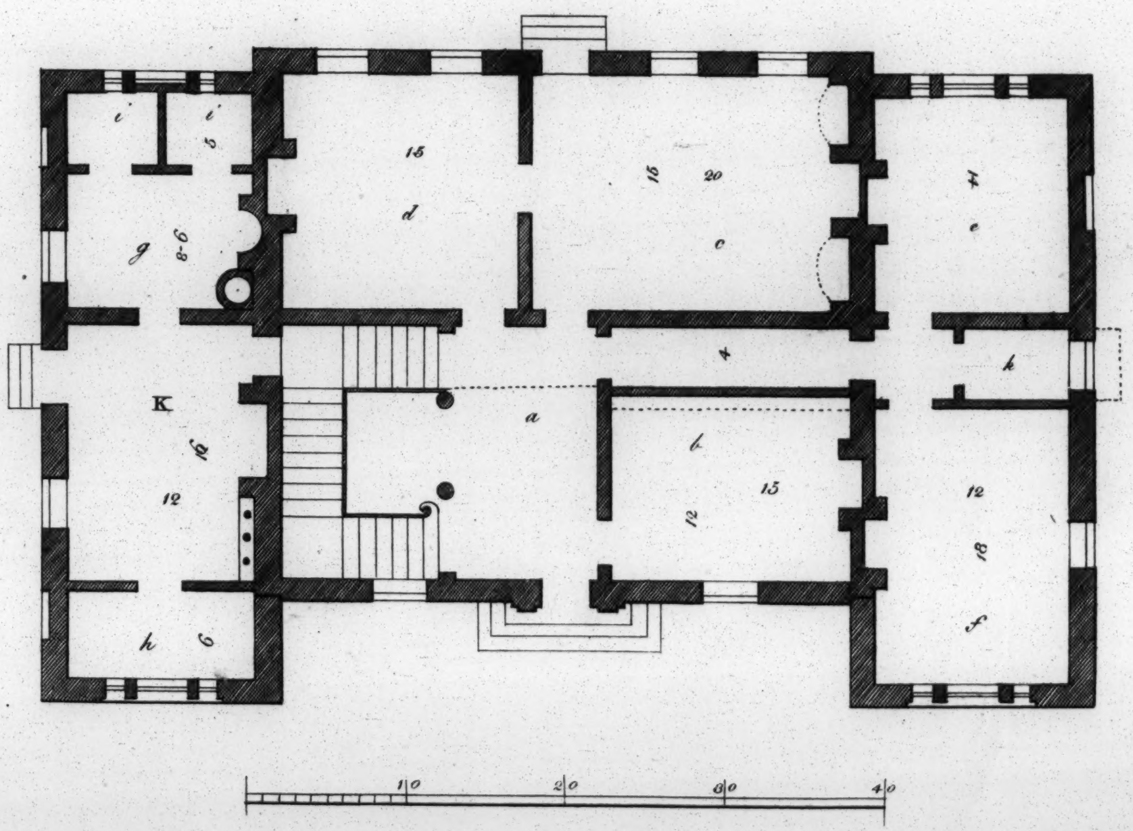

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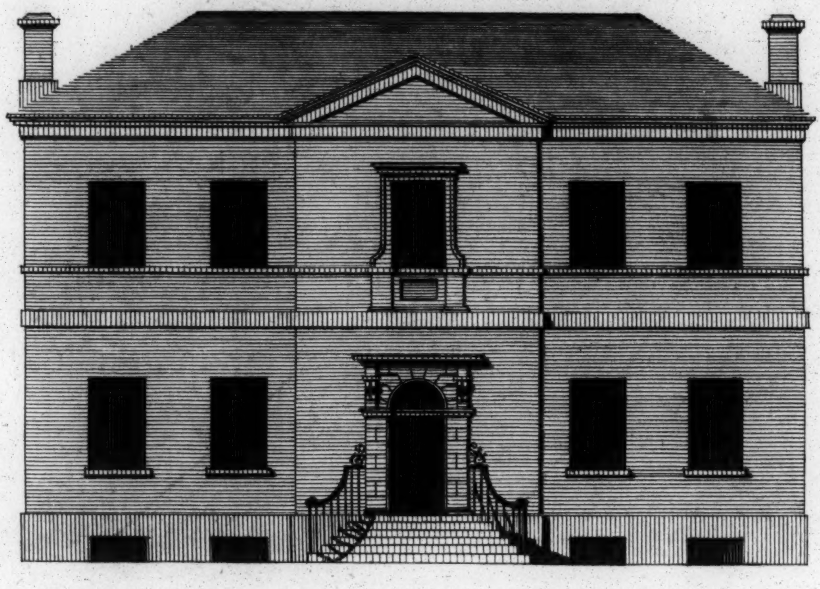

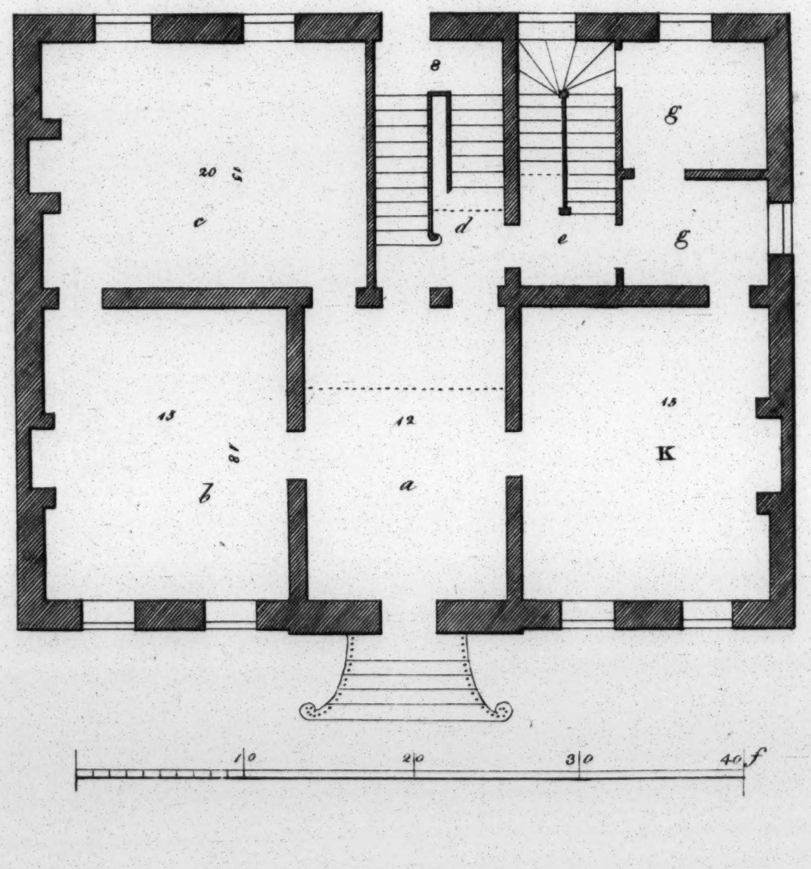

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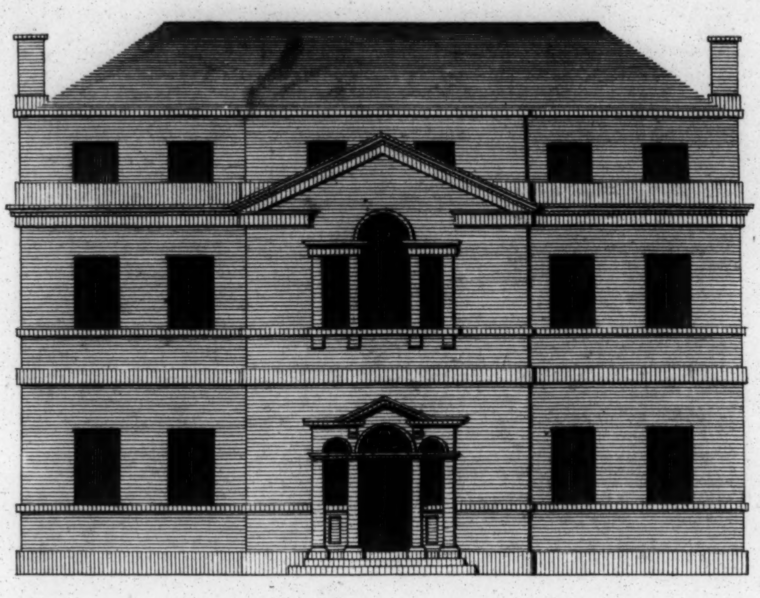
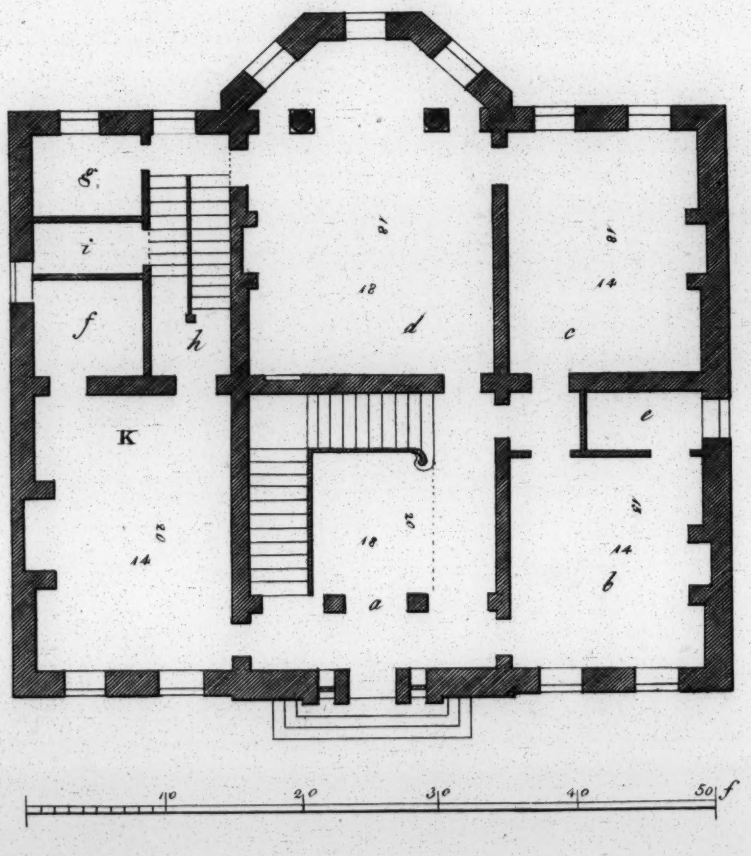
Plate VI.

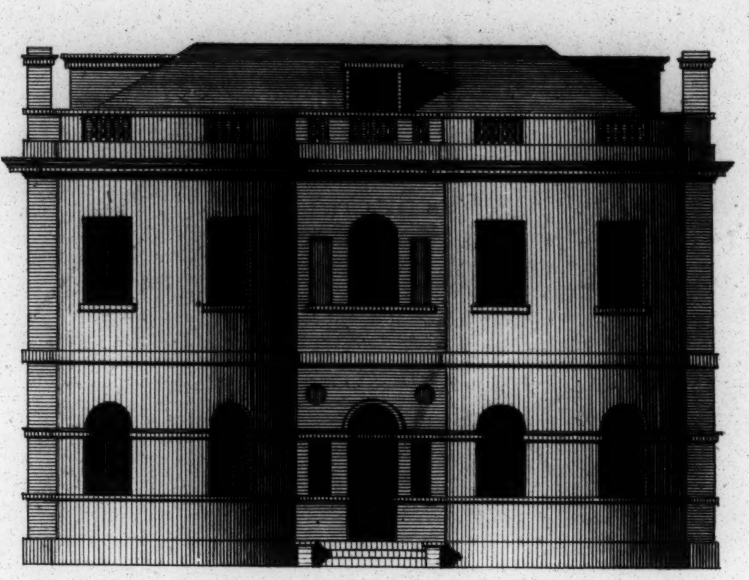


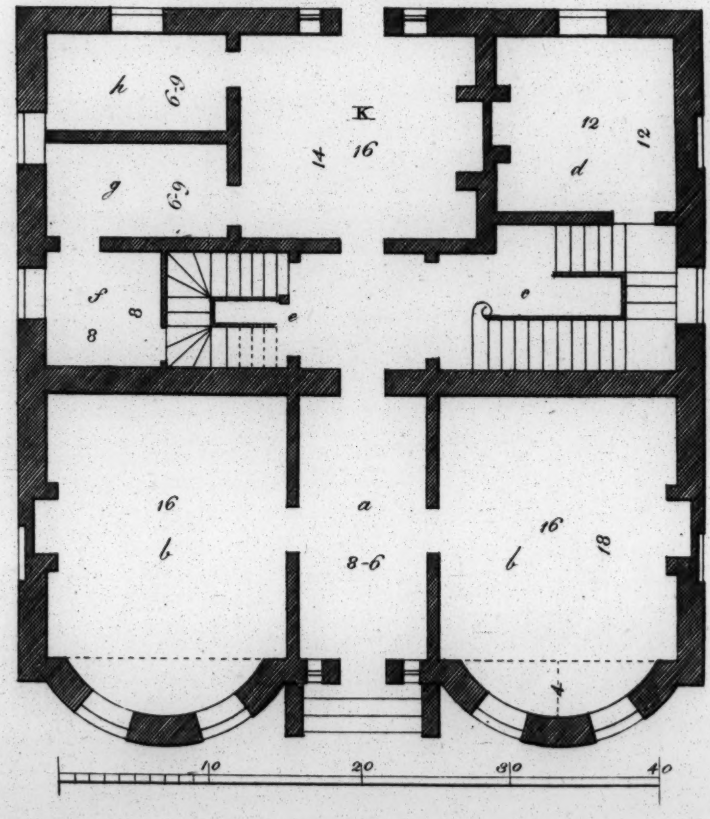


T Rawlins inv. et del.

T Miller sc.

Pl. VII.





T. Rawlinson et del.

T. Miller sc.

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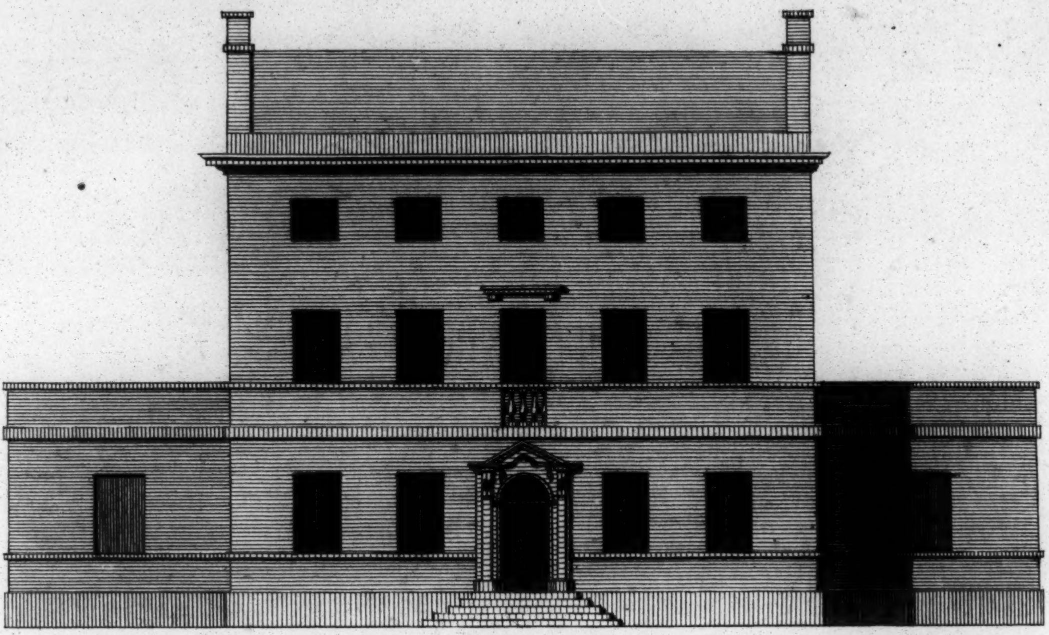
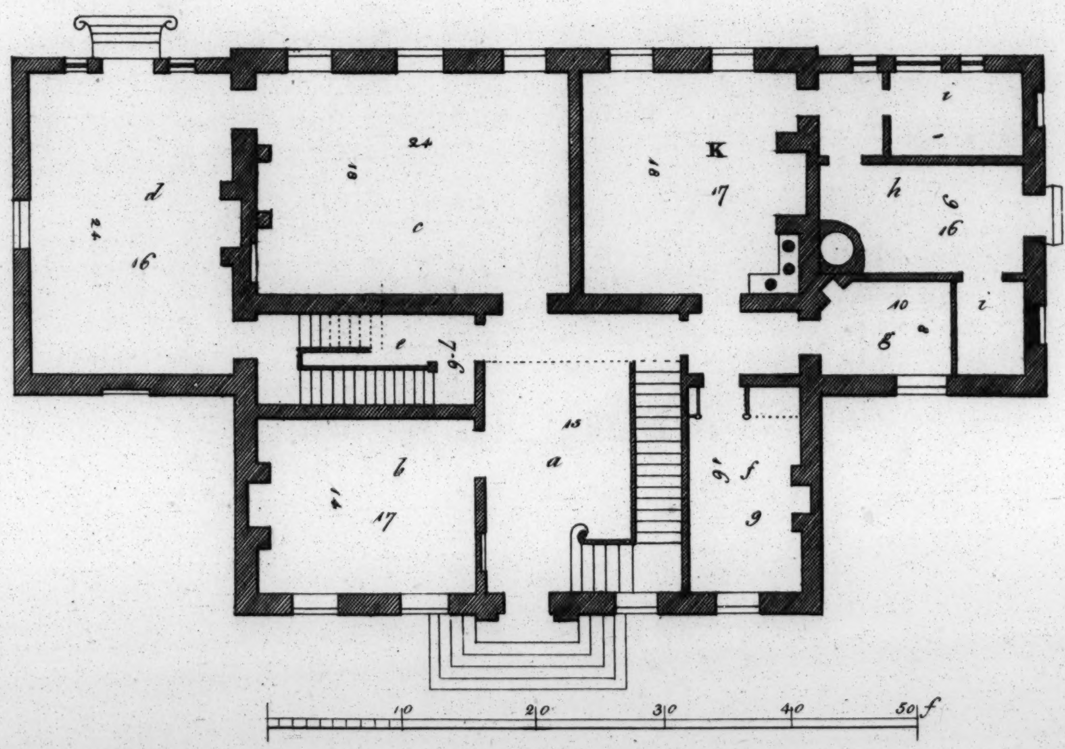
Plate VIII.

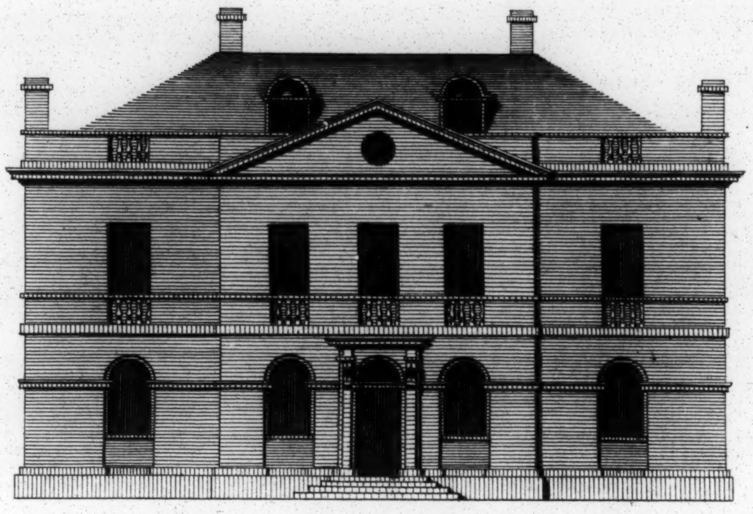


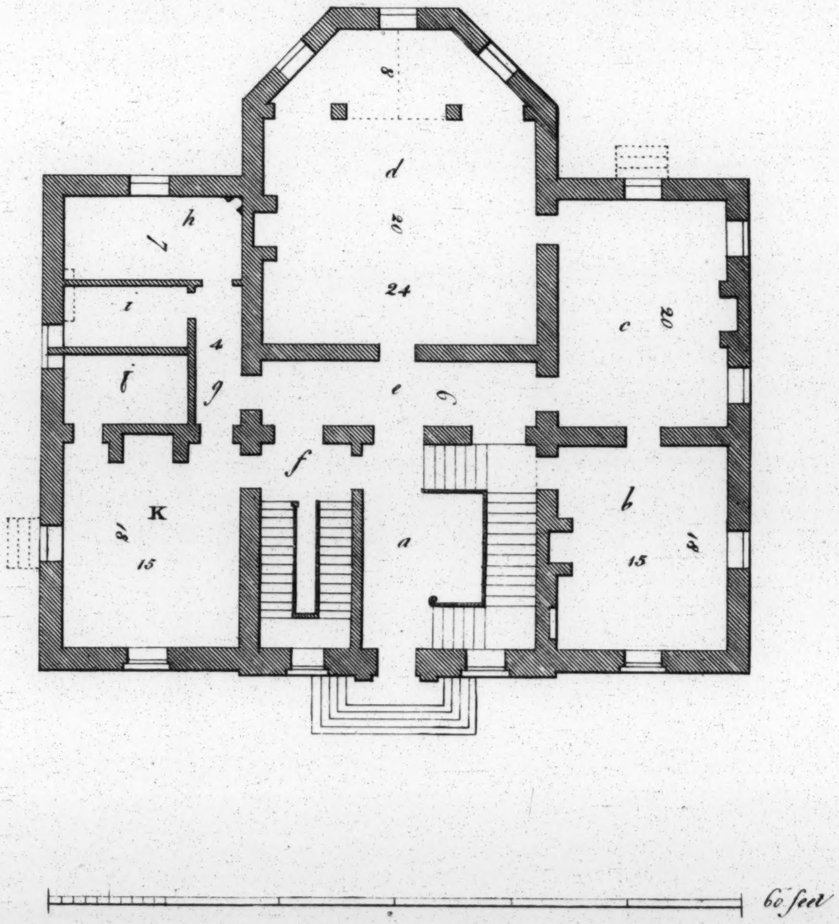


T. Rawlins inv. et del.

T. Miller sc.

PL. IX.

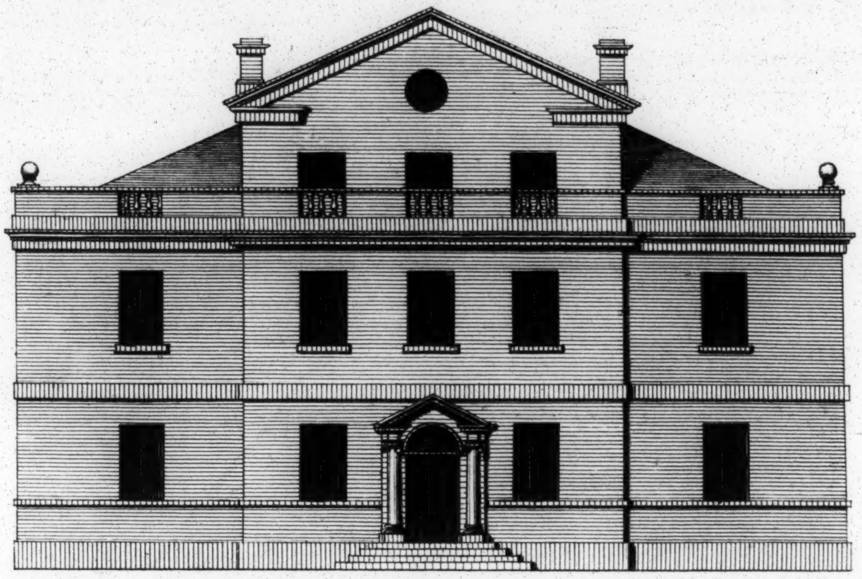


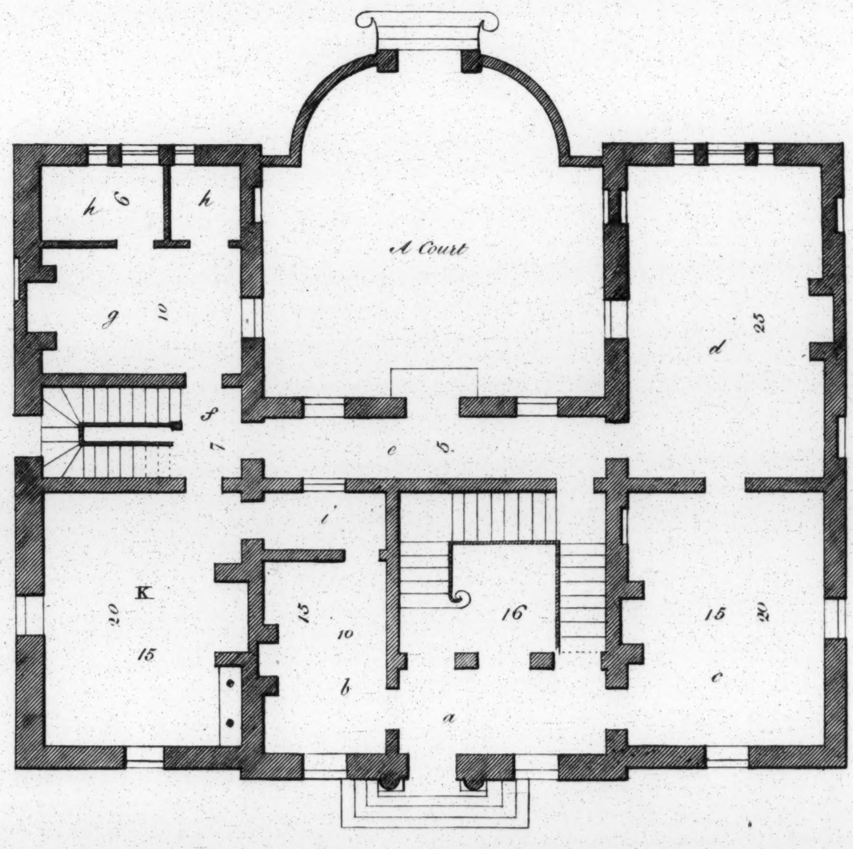


T. Rawlins inv et del.

T. Miller sc.

Pl X

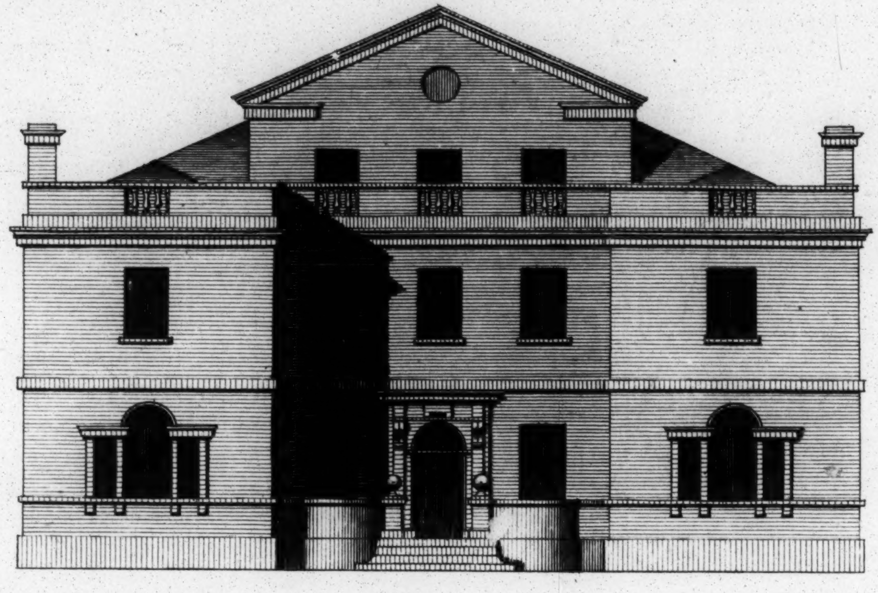


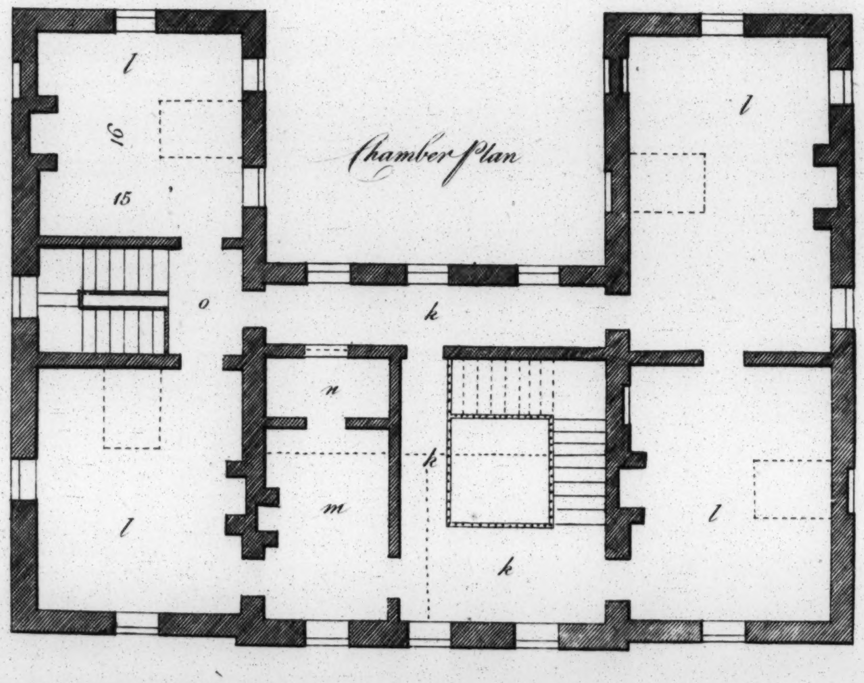


T. Rawlins in et del.

T. Miller sc.

Pl. XI.





T. Rawlins in. & del.

T. Miller sc.

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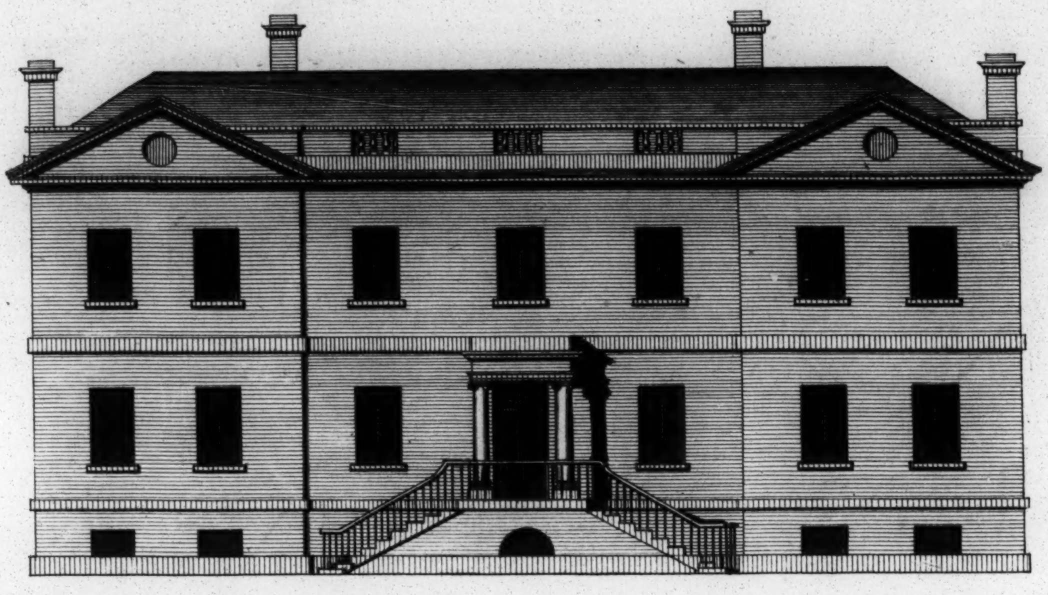
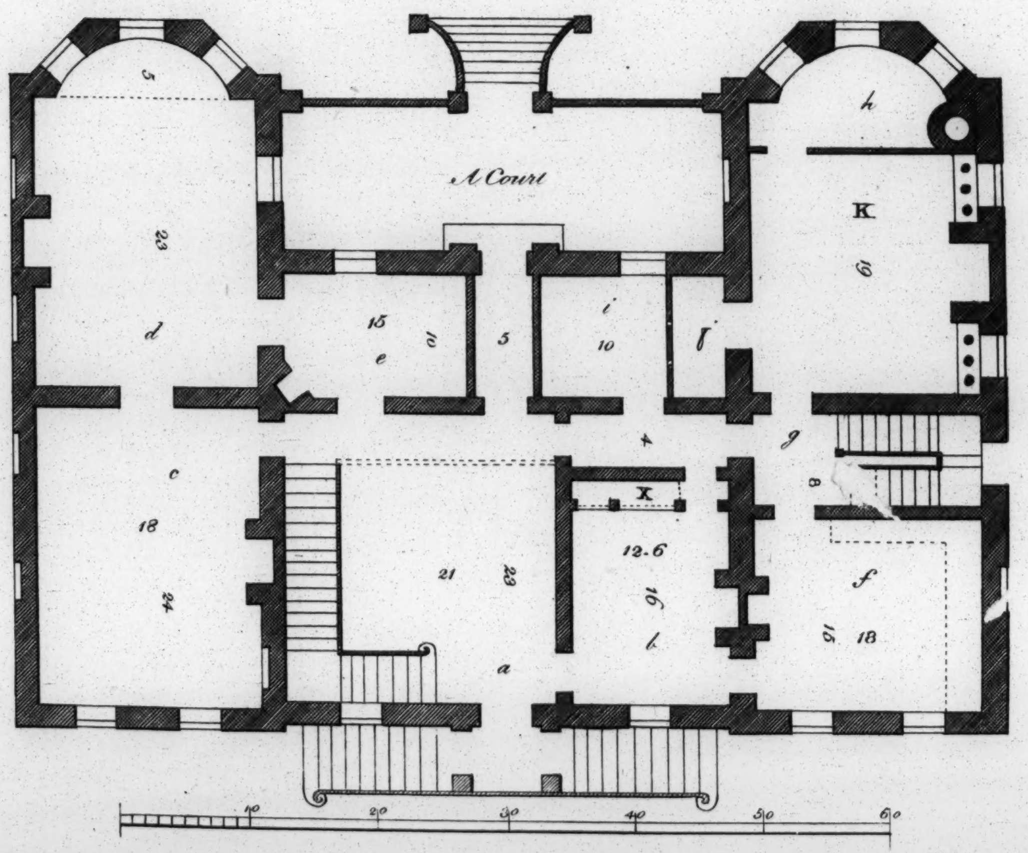
Pl. XII.

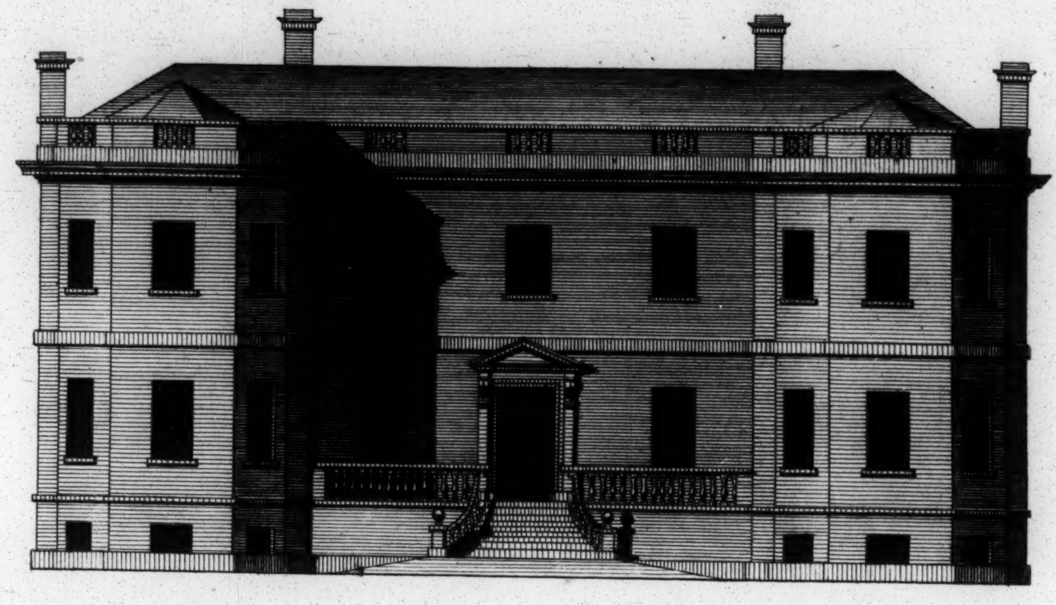


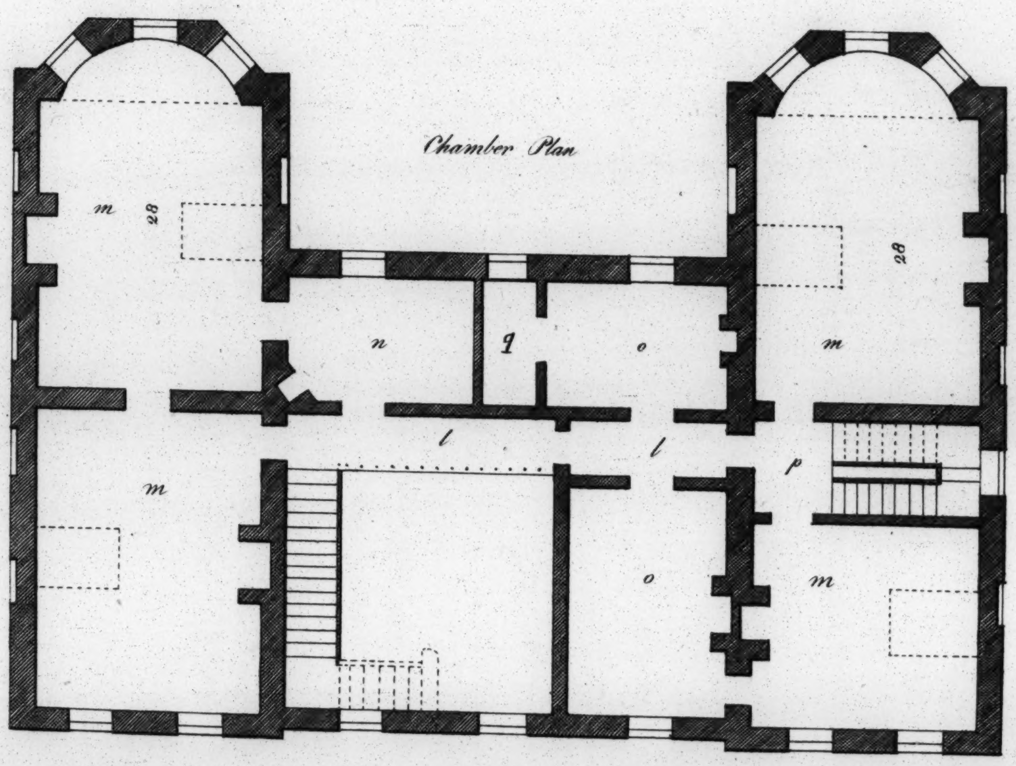


T Rawlins in et del.

T. Miller sc.

Pl XIII

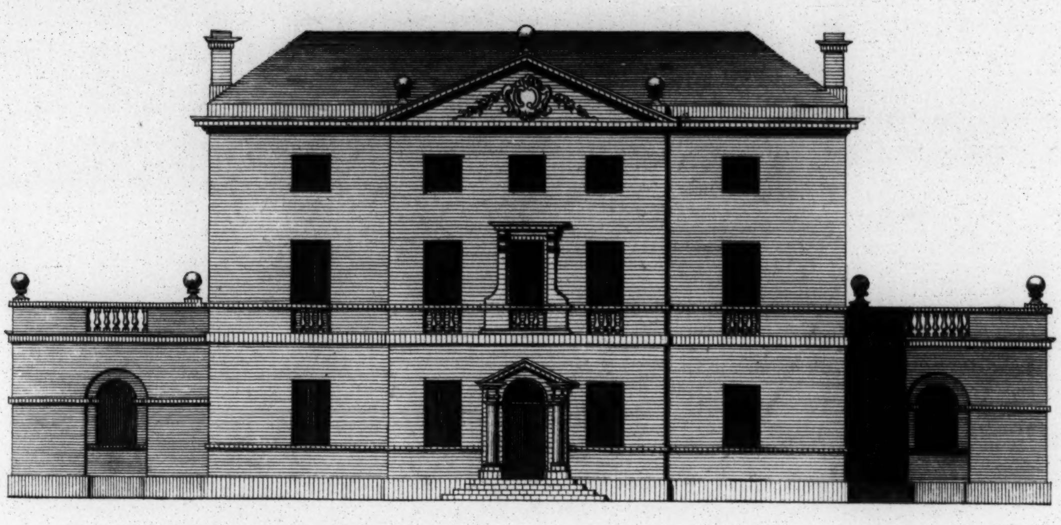


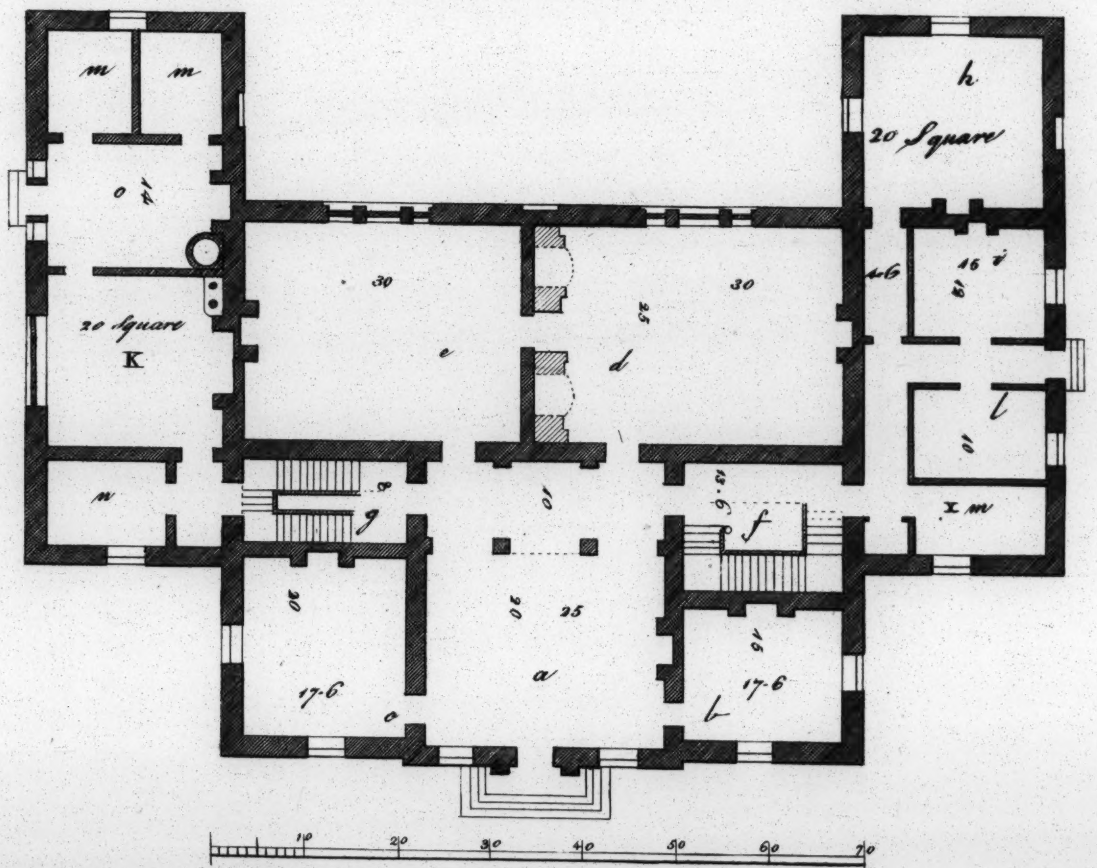


T. Rawlins inv et del.

T. Miller sc.

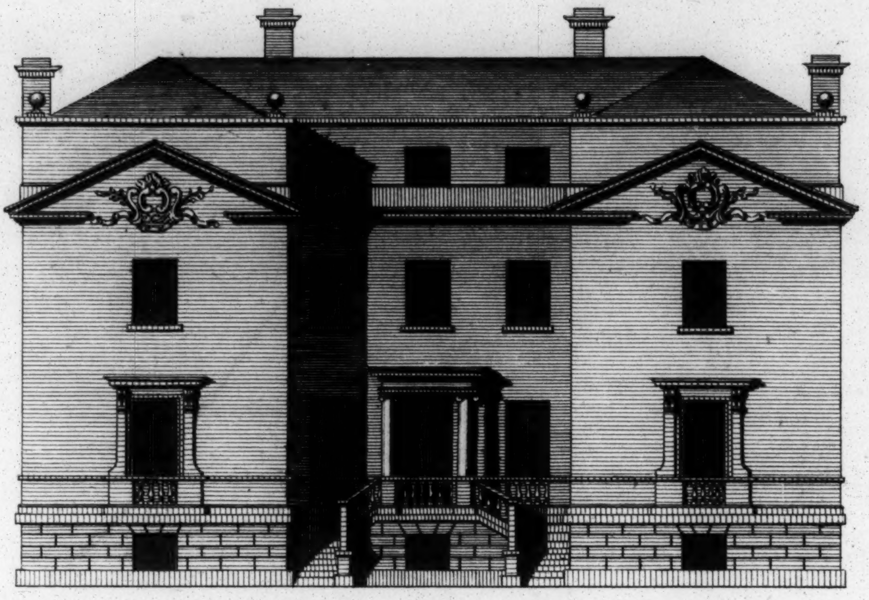
Pl. XIV.

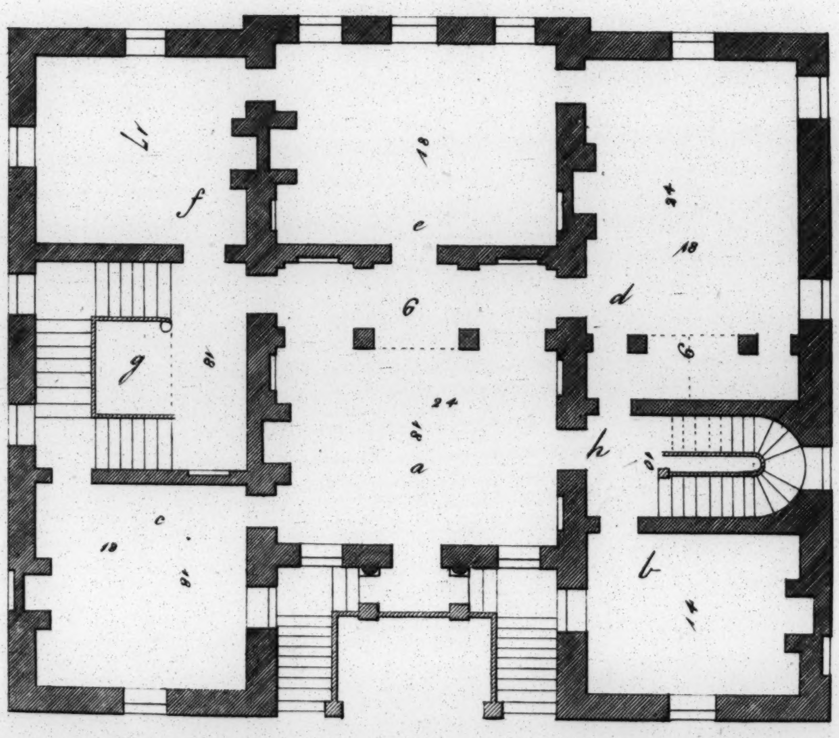




T. Rawlins inv. et del.

T. Miller sculp.

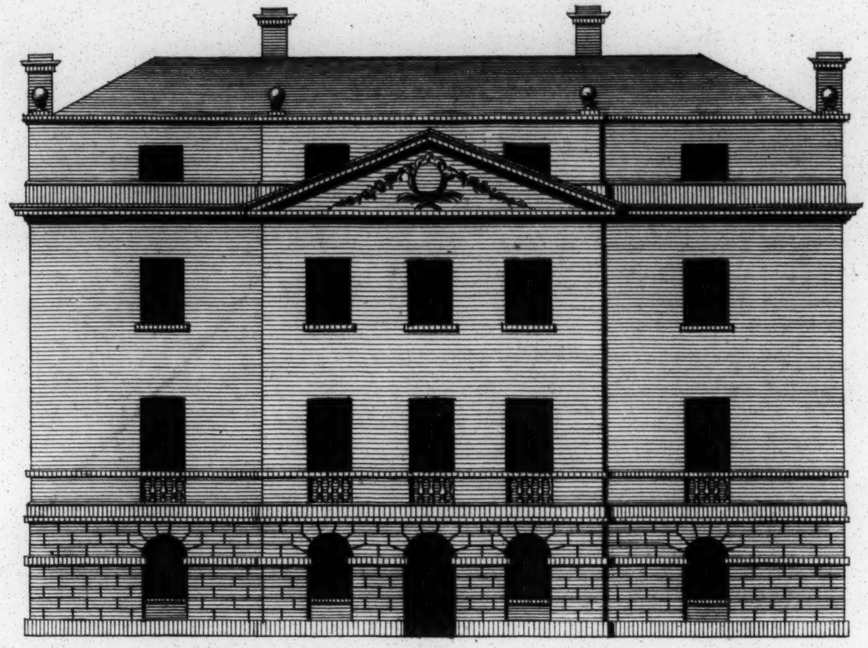


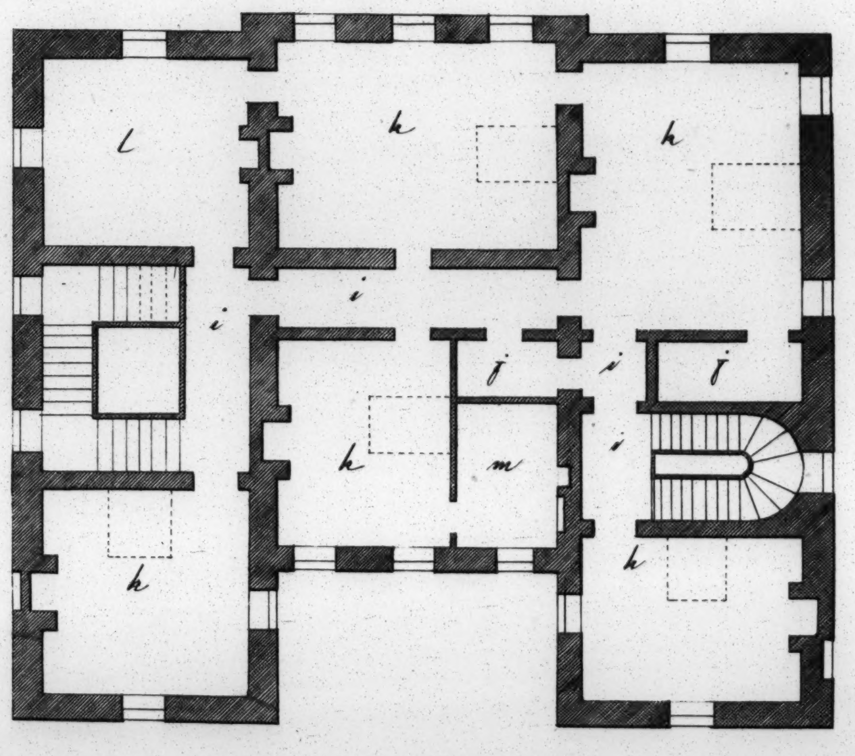


T. Rawlins inv. et del.

T. Miller sculp.

MUSEUM



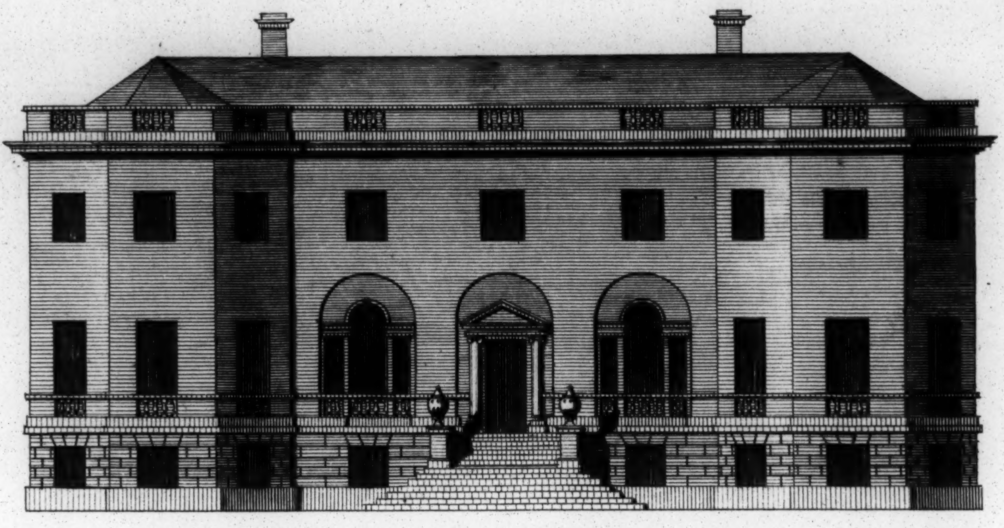


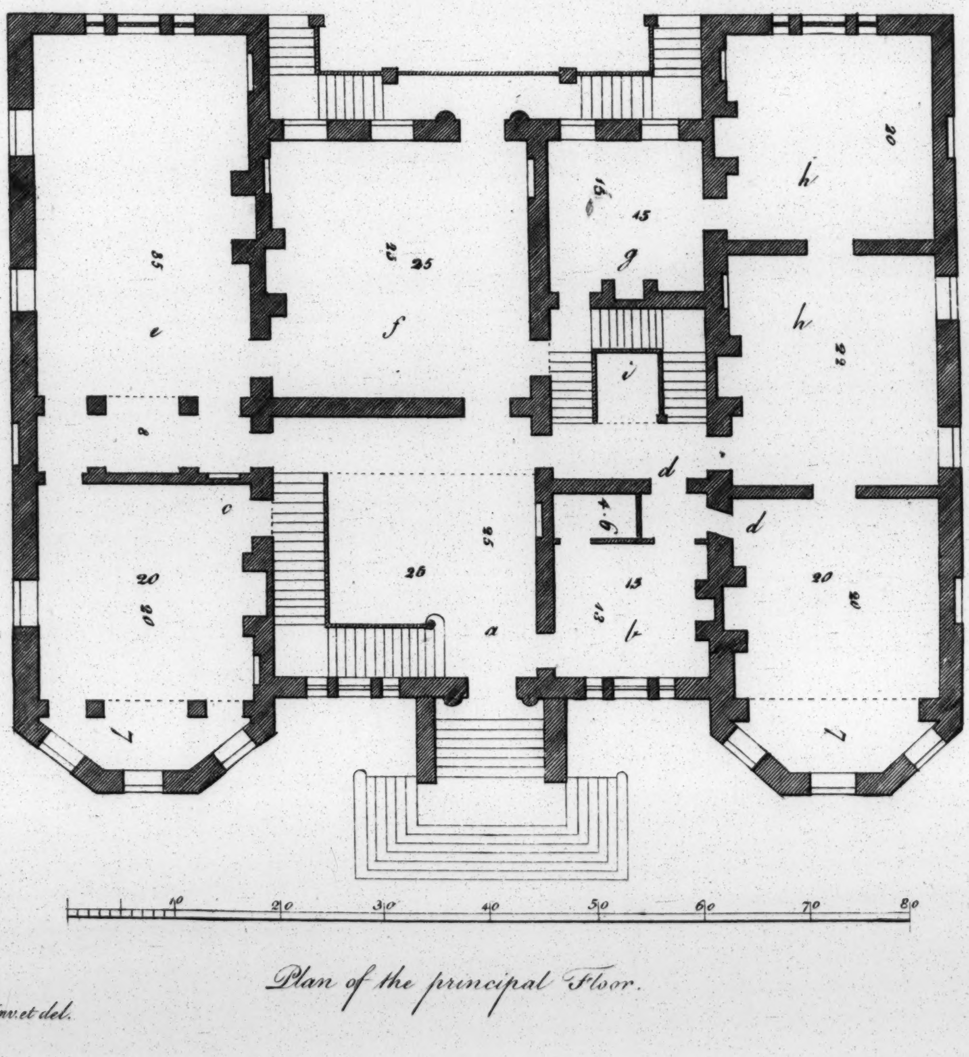
Plan of the Chamber Floor.

T. Rawlins inv. et del.

T. Miller sculp.

Pl. XVII.





Plan of the principal Floor.

T. Rawlins inv. et del.

T. Miller sculp.

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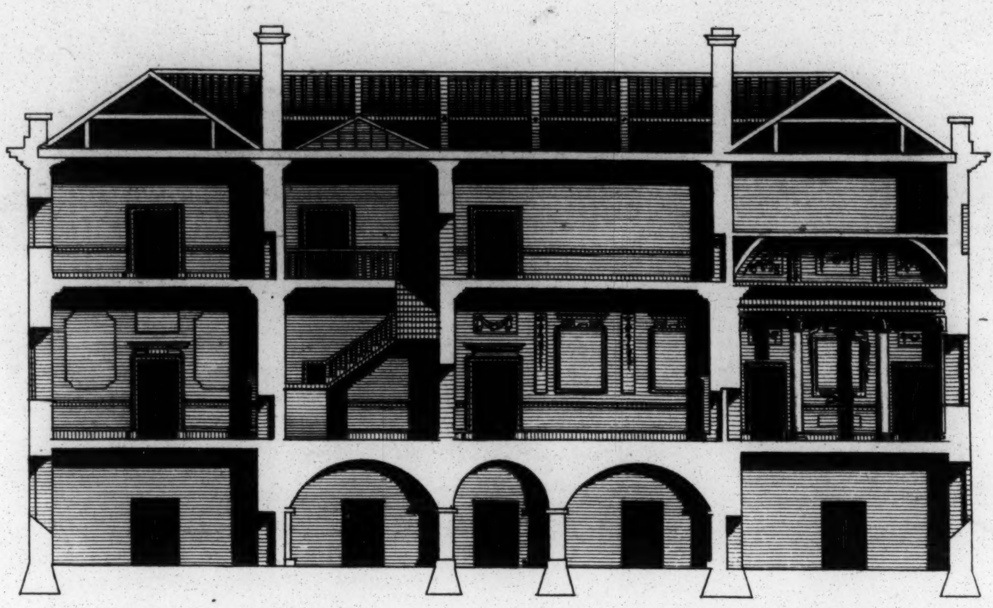
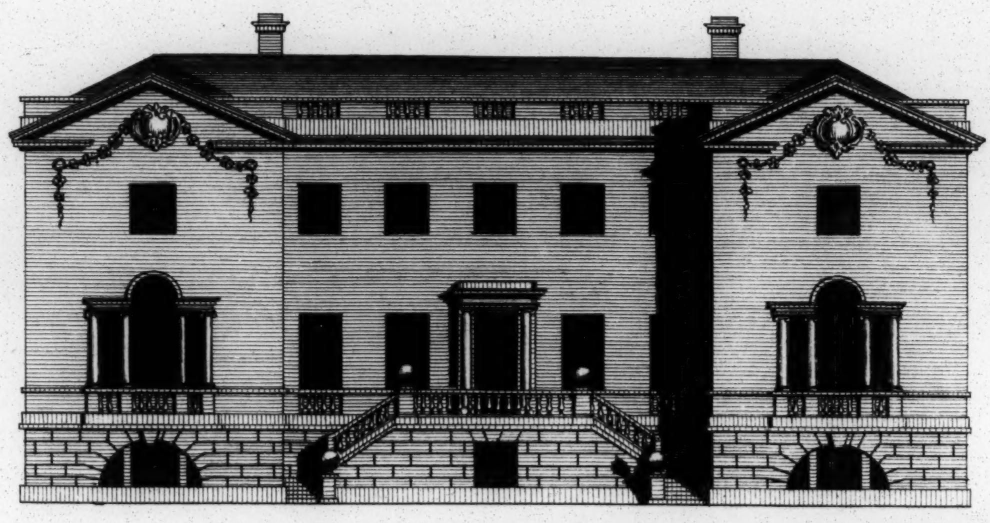
Pl. XVIII.

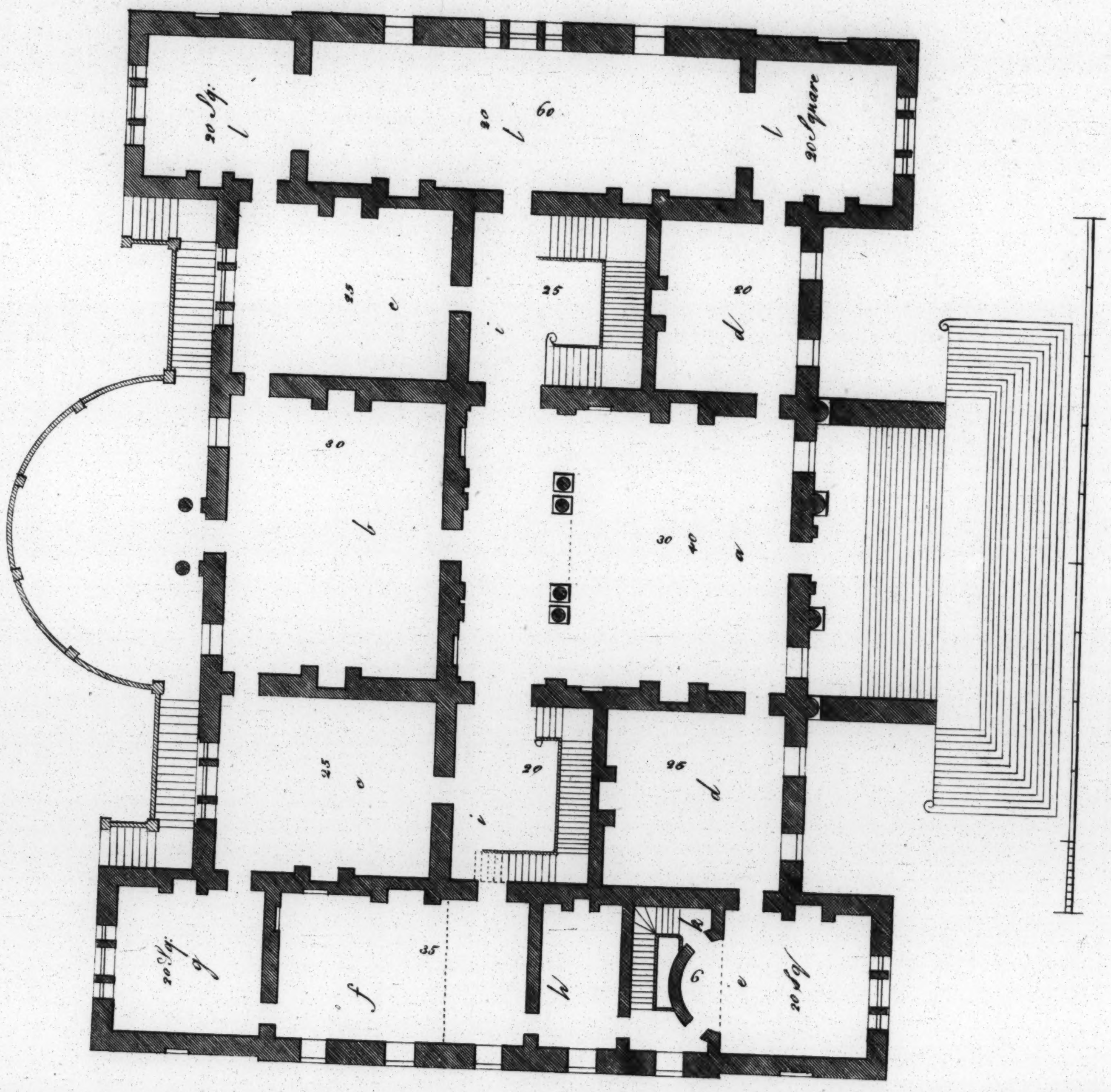




T. Rawlins inv. et del.

T. Miller sculp.

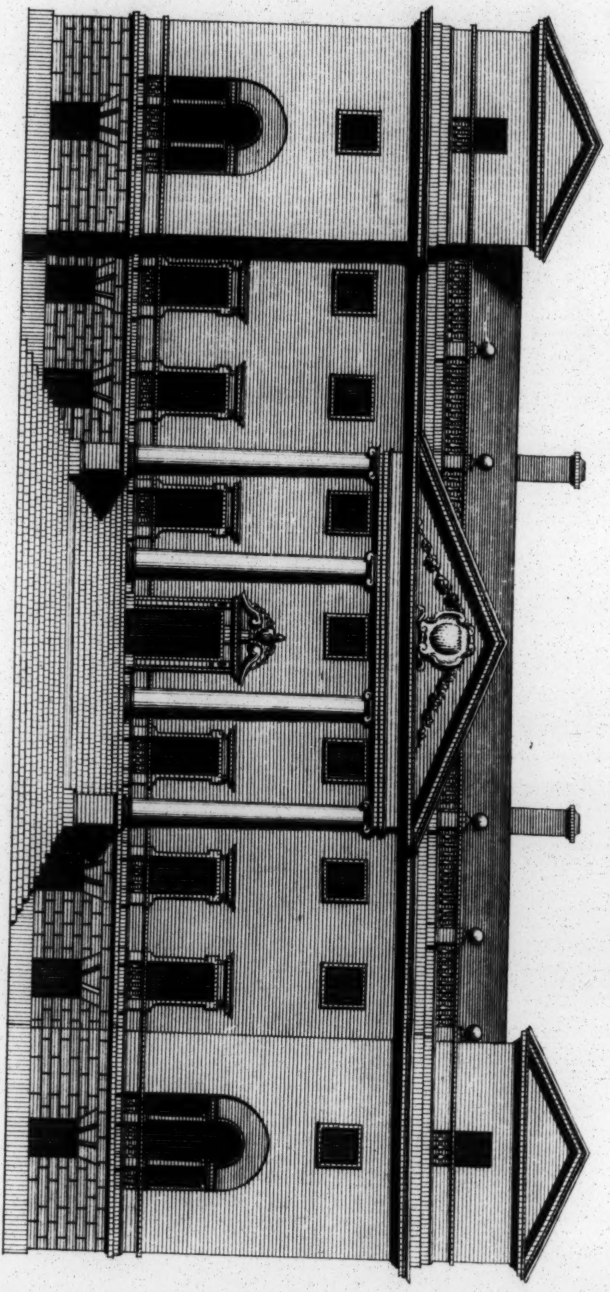
Pl. XIX.



T Rawlins Inv.t

T Miller sc.

Pl: XX.

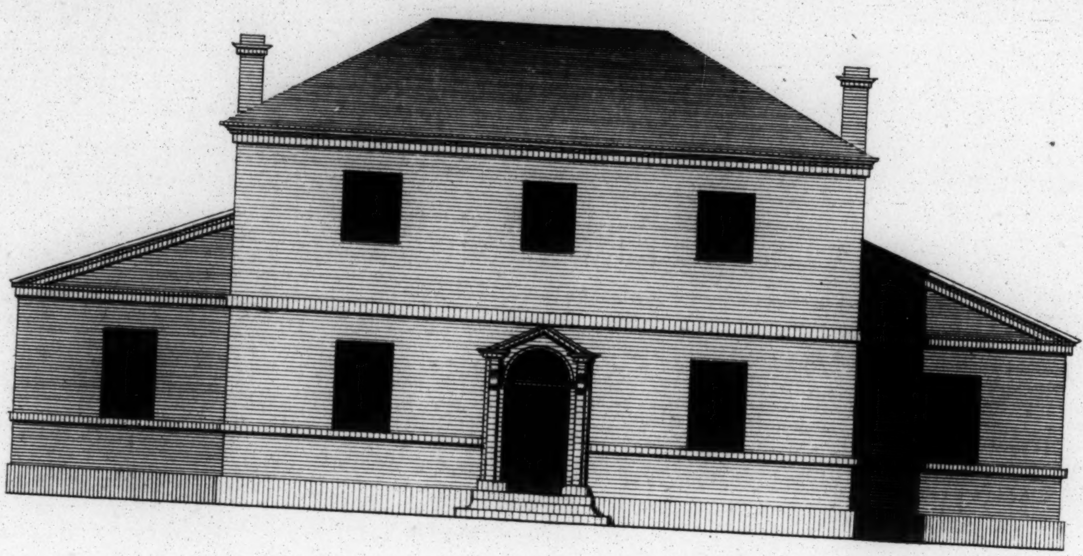


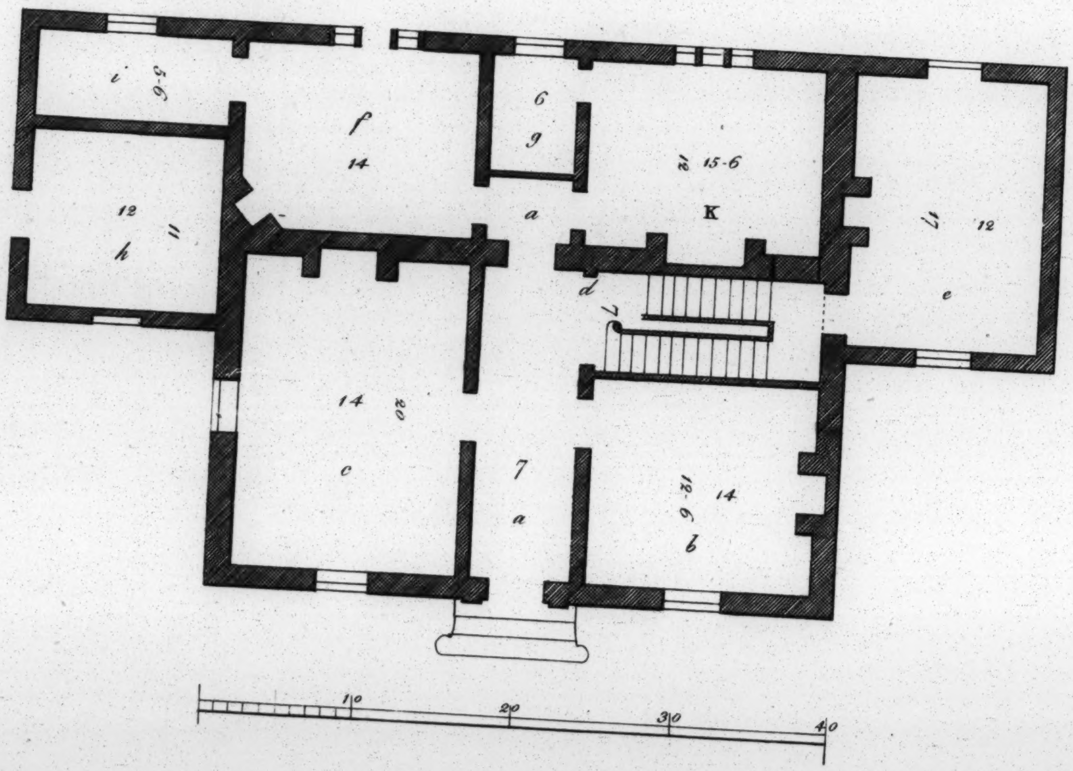
T. Rawlins inv. et del.

T. Miller sculp.

BRITISH
MUSEUM

Pl. XXI.

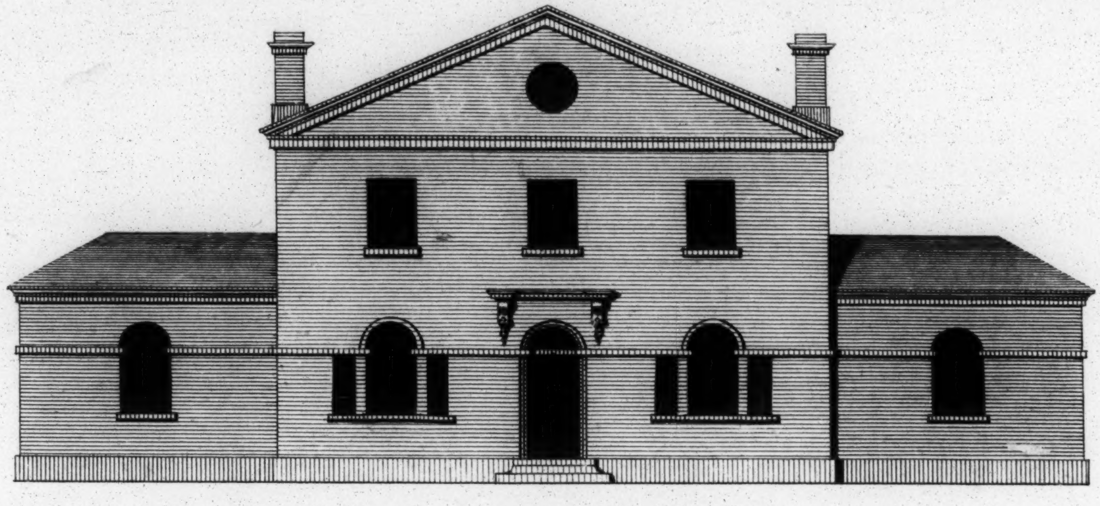


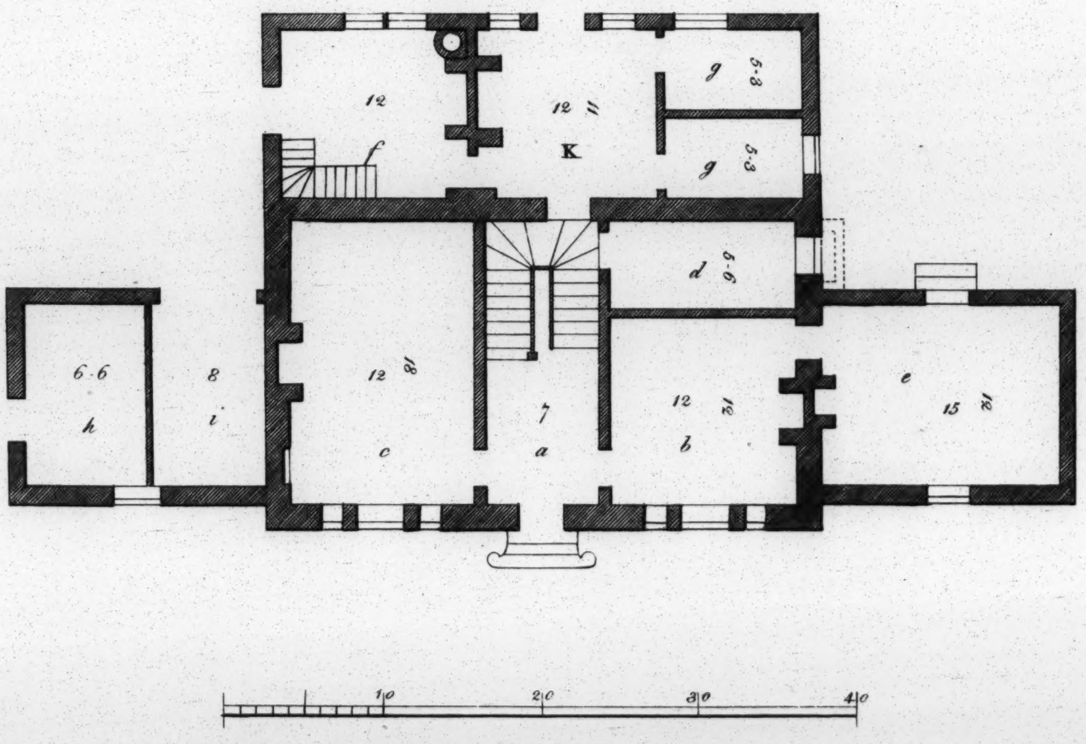


T. Rawlins inv. et del.

T. Miller sculp.

Pl. XXII.

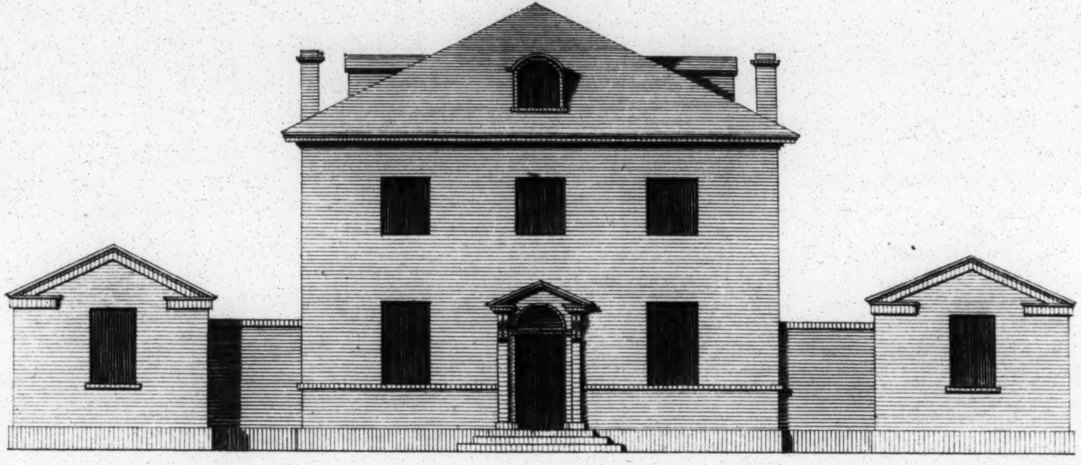


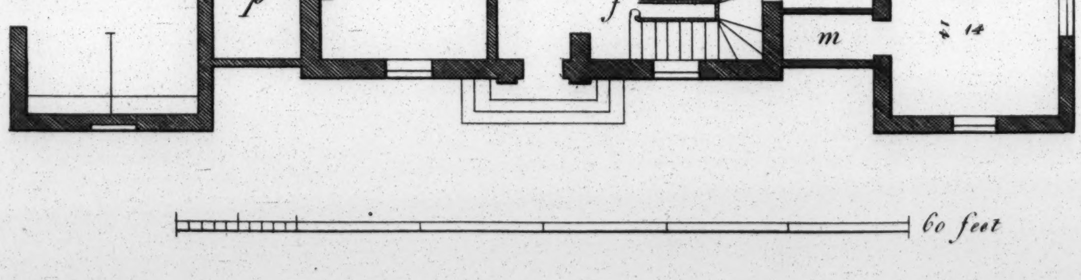


T. Rawlins inv. et del.

T. Miller sculp.

Pl. XXIII.

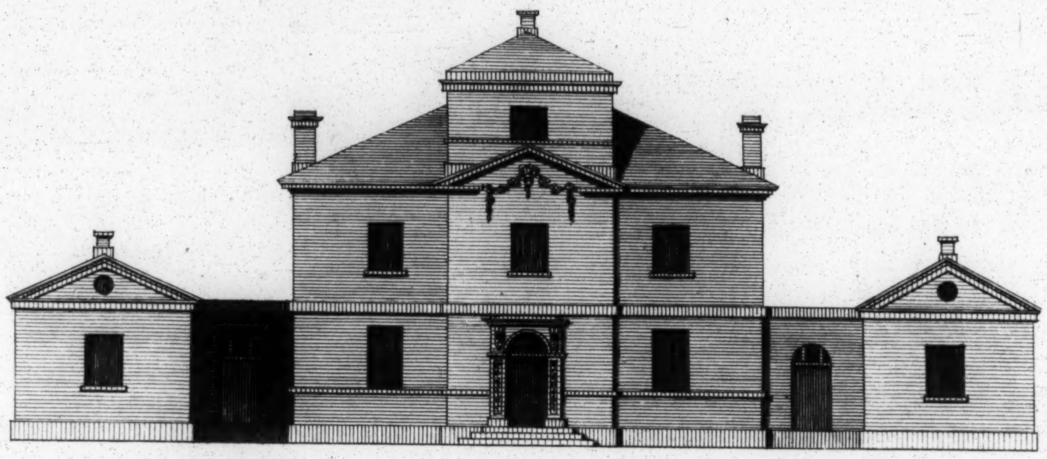


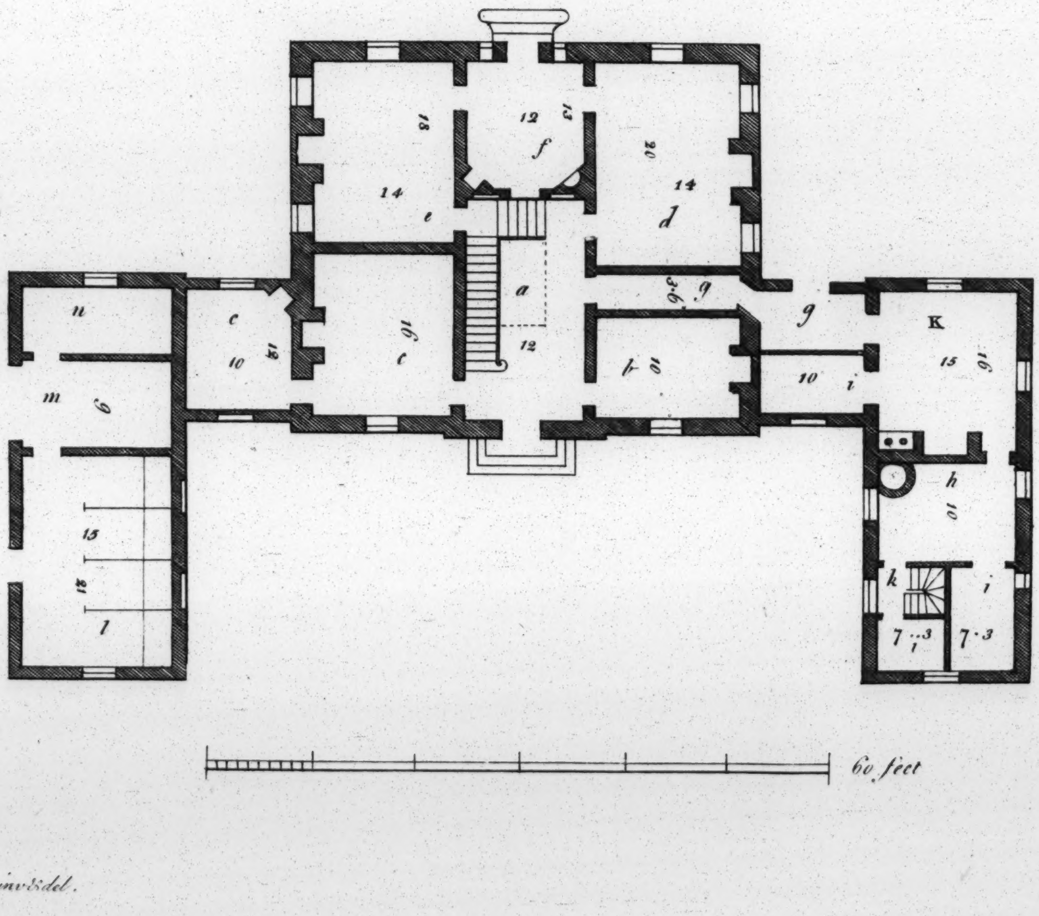


T. Rawlins inv. & del.

T. Miller sculp.

P1. XXIV

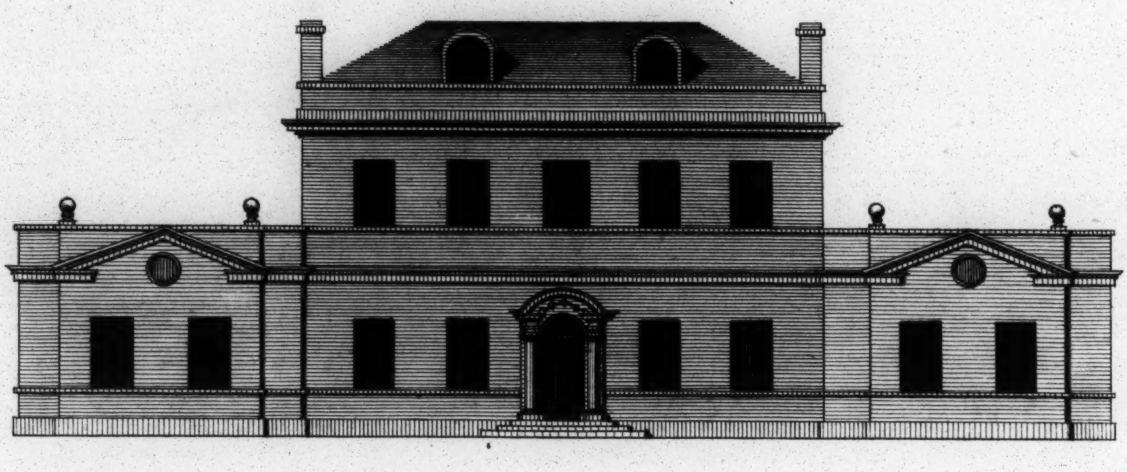


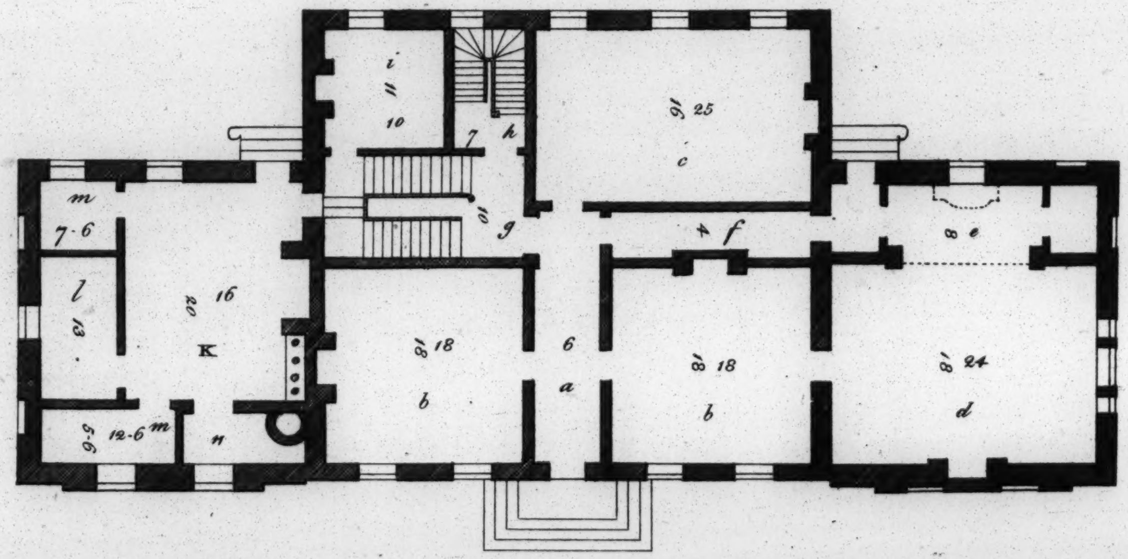


T. Rawlins inv. & del.

T. Miller sculp.

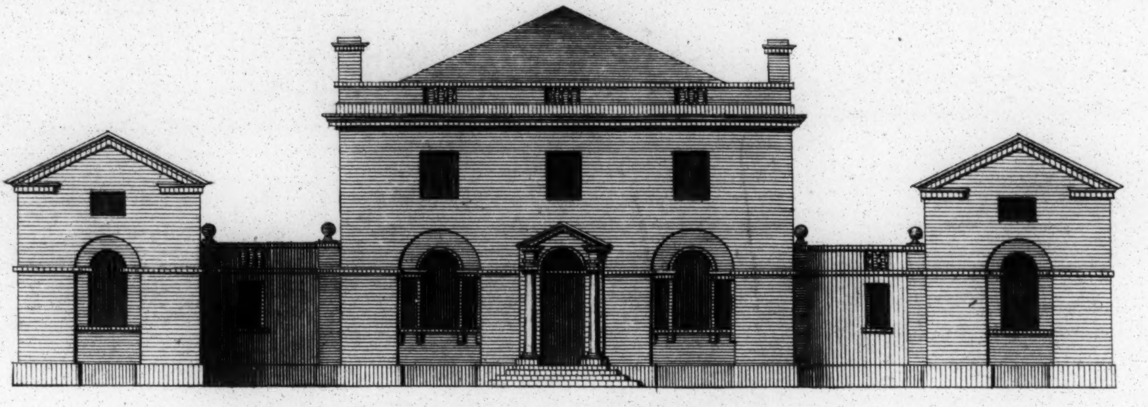
Pl. XXV.

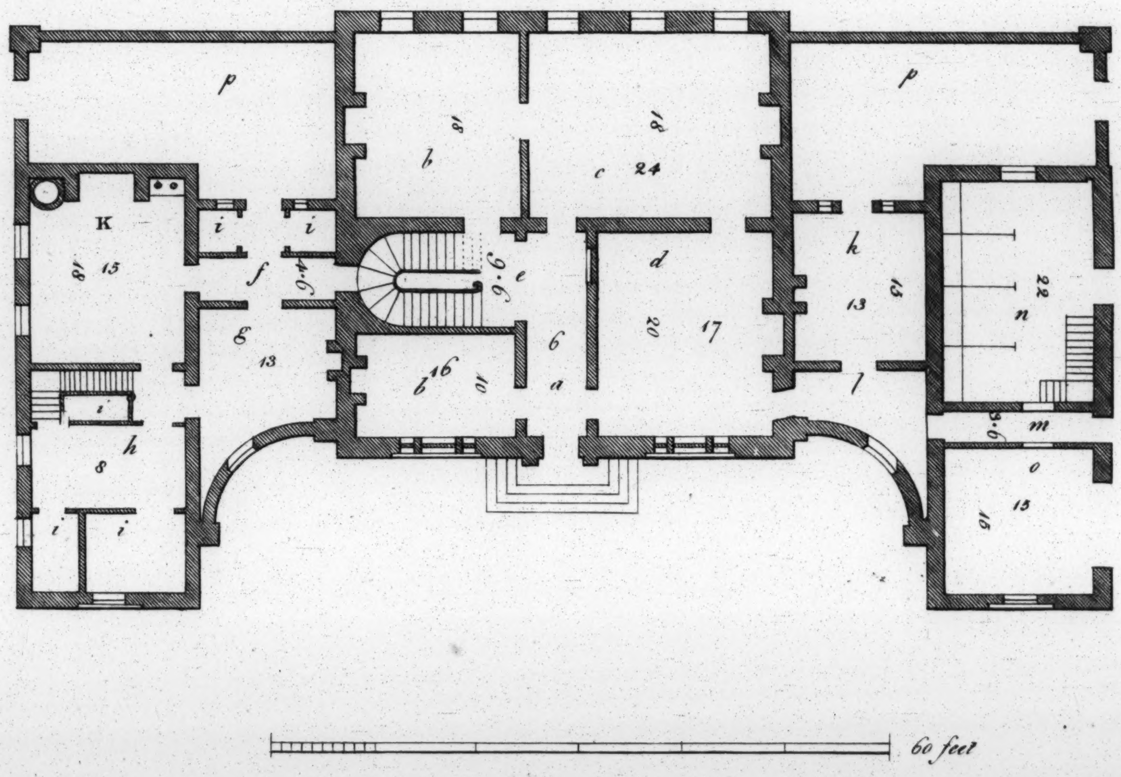




T. Rawlins inv et del.

T. Miller sculp.

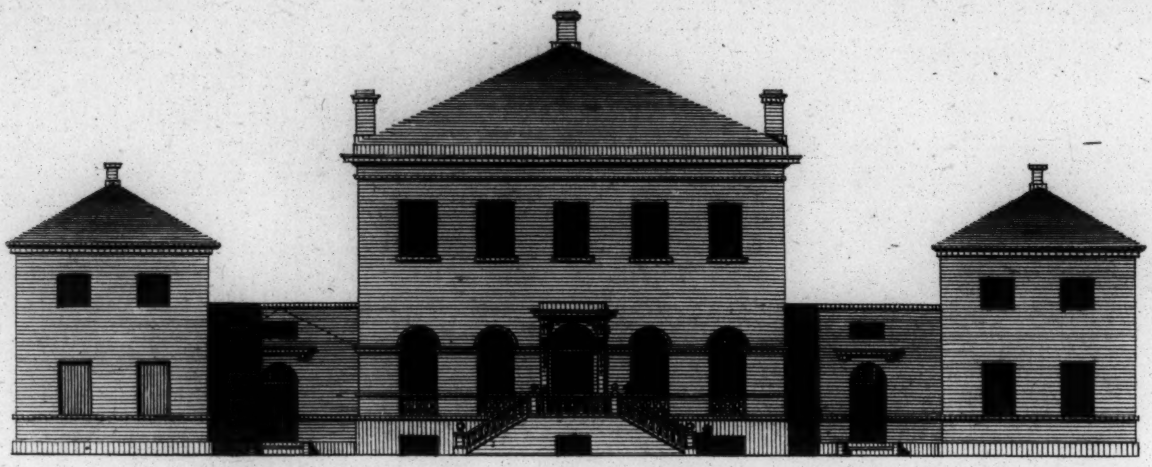


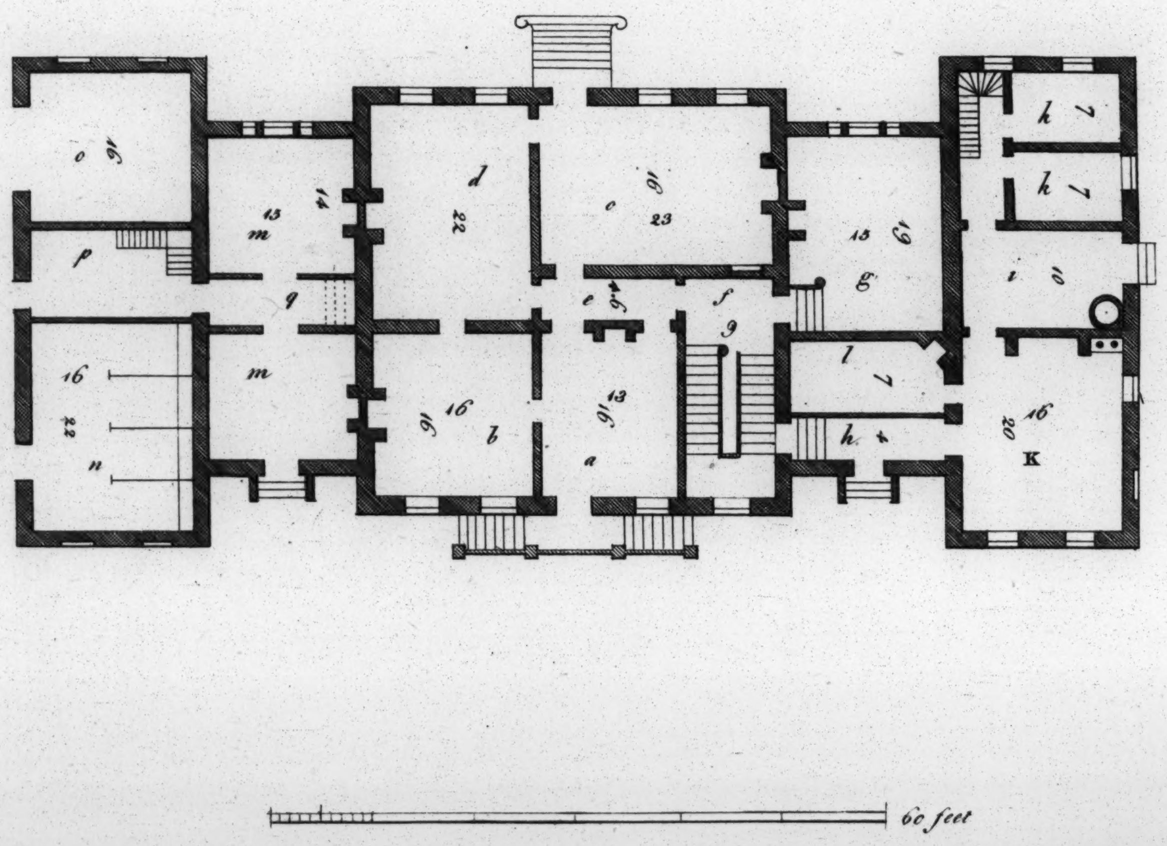


T. Rawlins inv et del.

T. Miller sc

PL. XXVII.

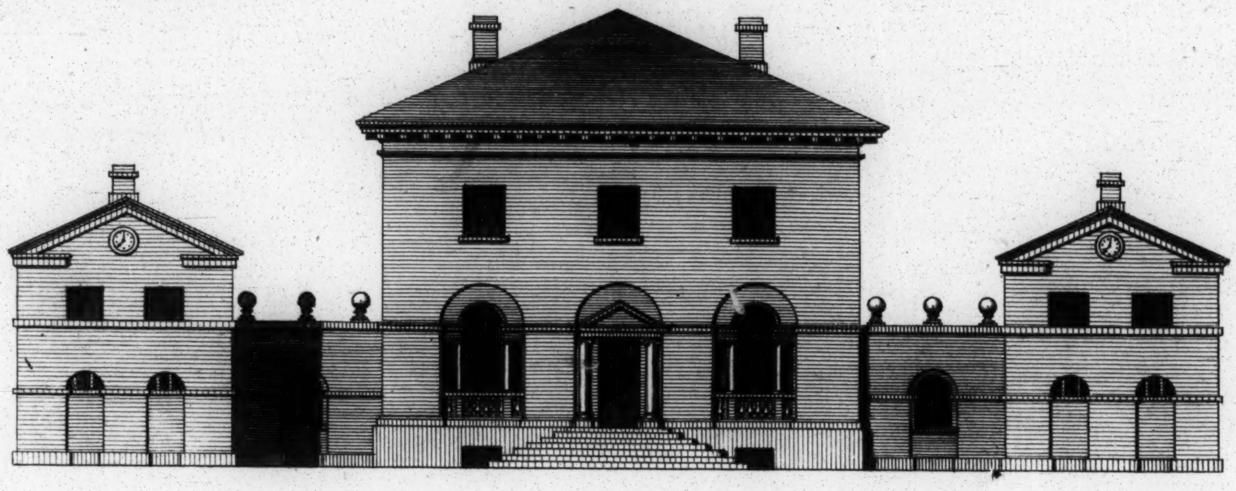


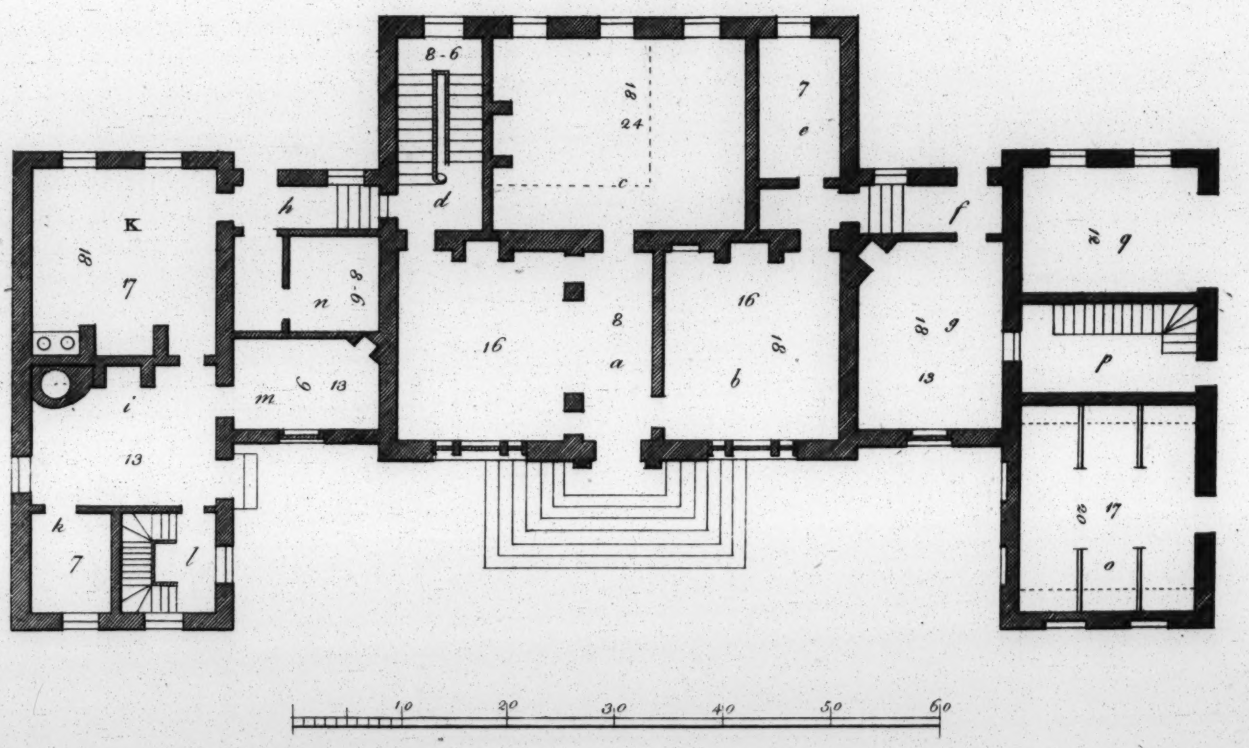


T. Rawlins in. et del.

T. Miller sc.

Pl. XXVIII.

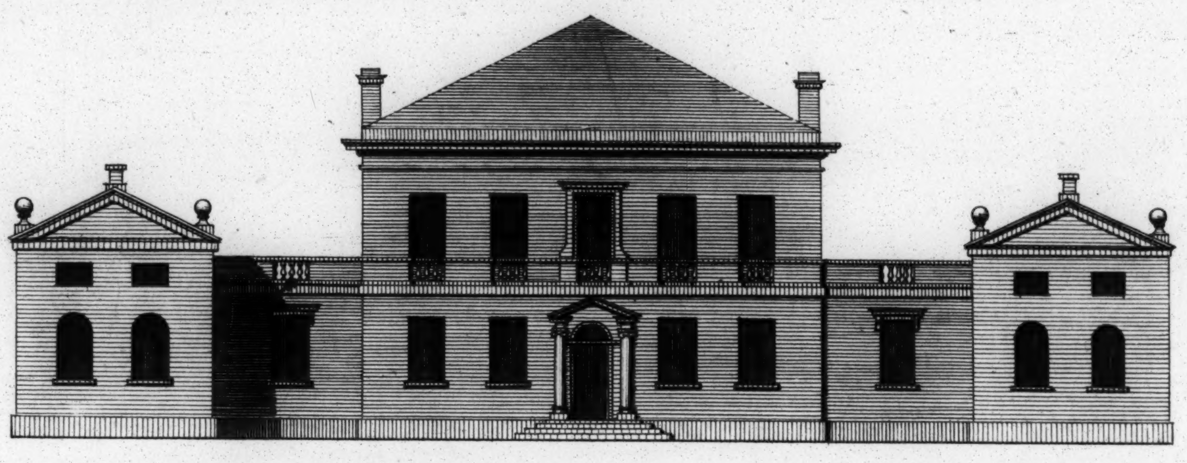


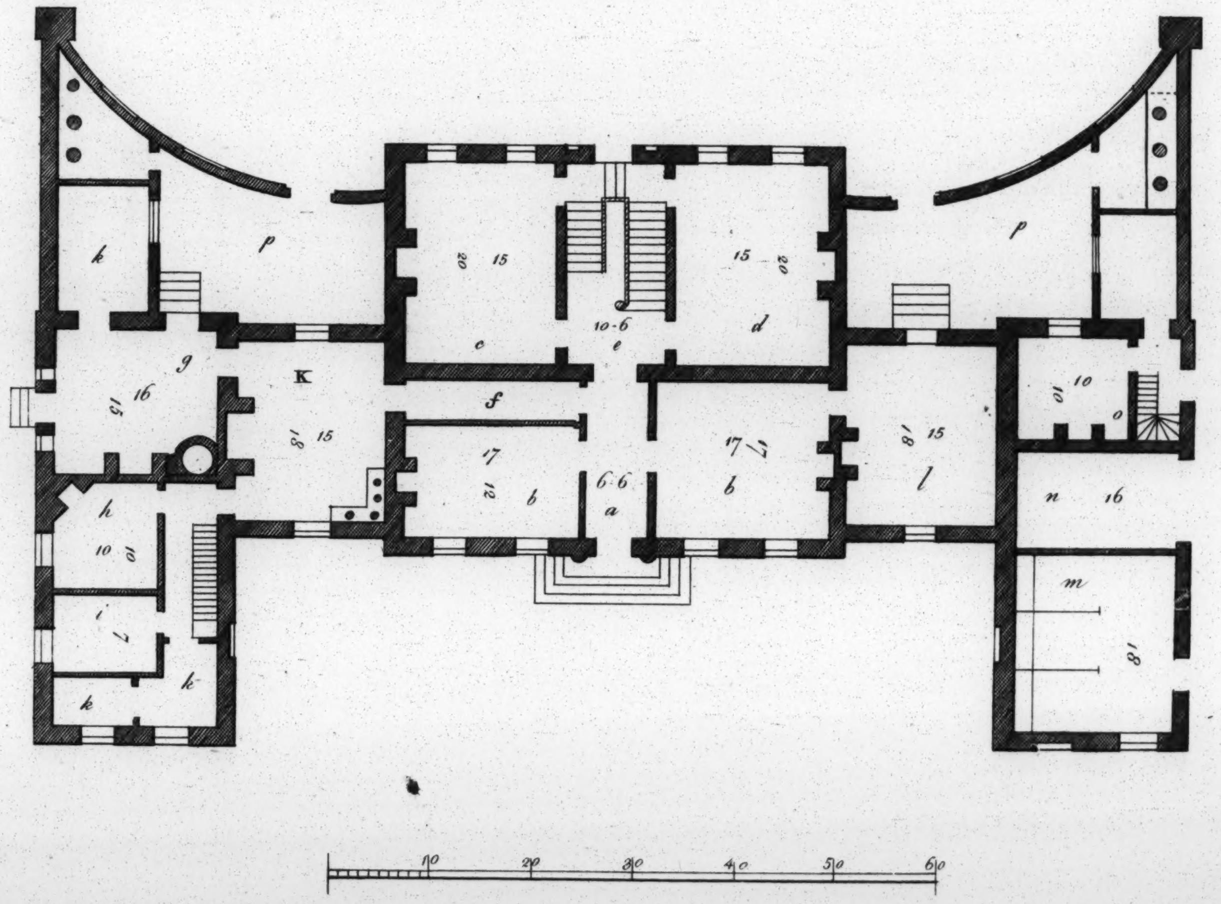


T. Rawlins inv et del.

T. Miller sculp.

Pl. xxix.

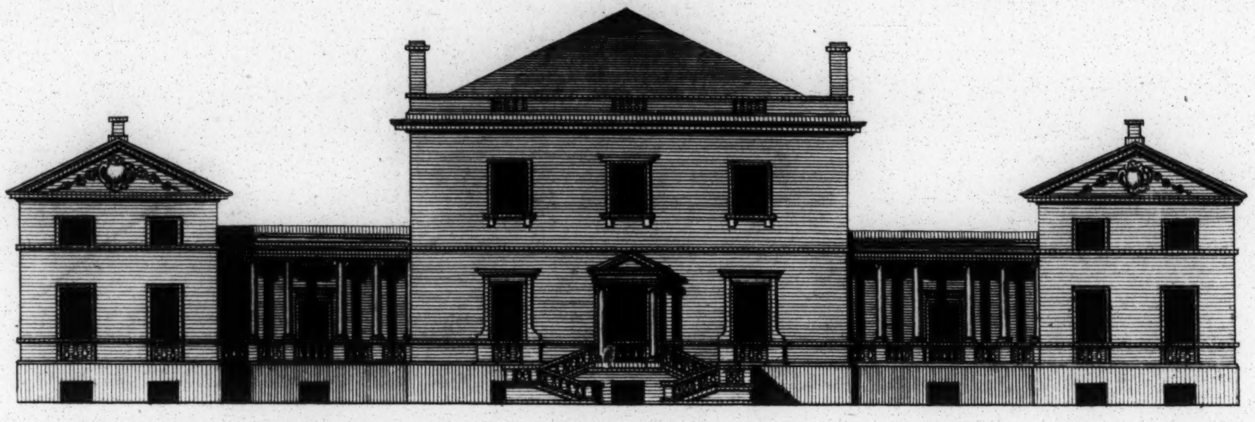


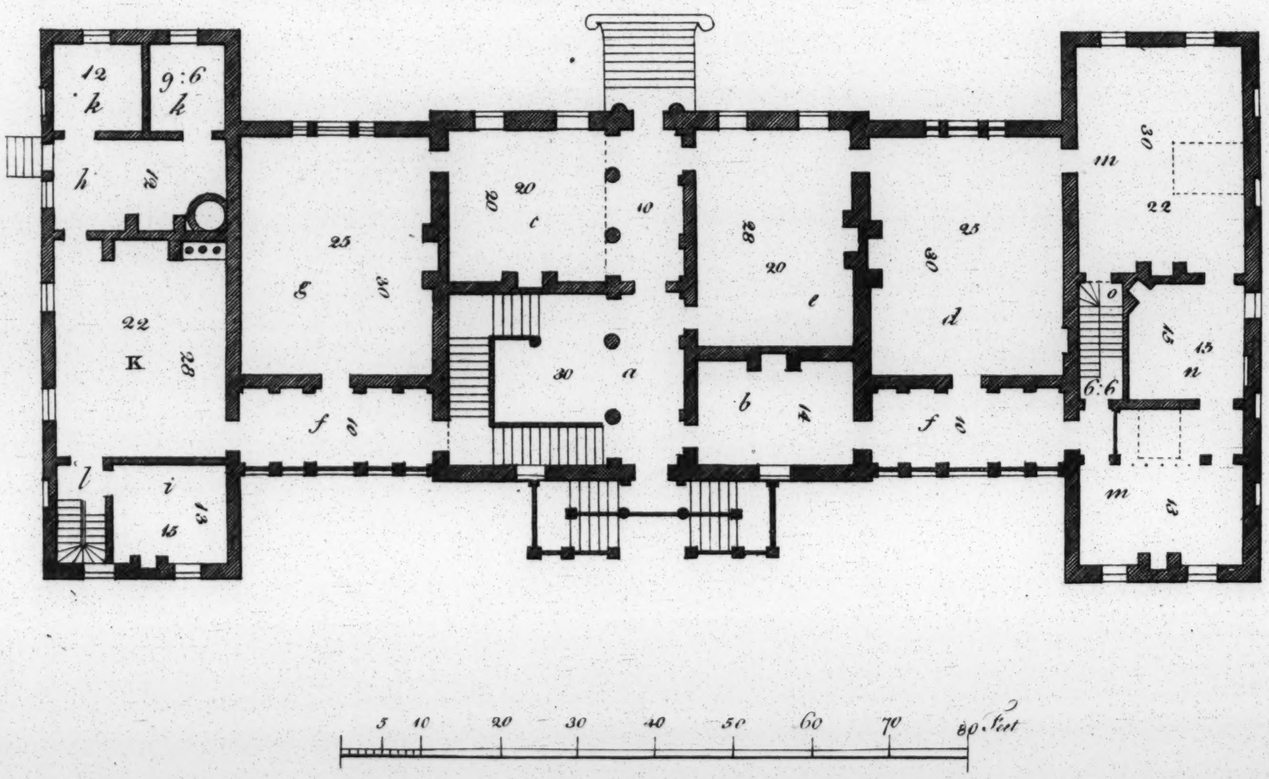


T. Rawlins invet del.

T. Miller sculp.

Pl. XXX.

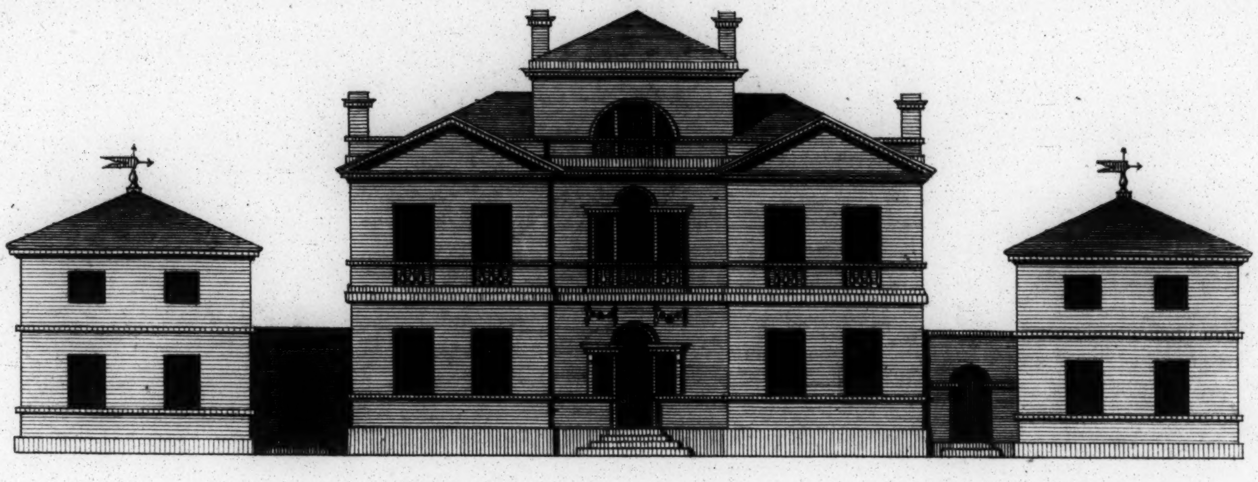


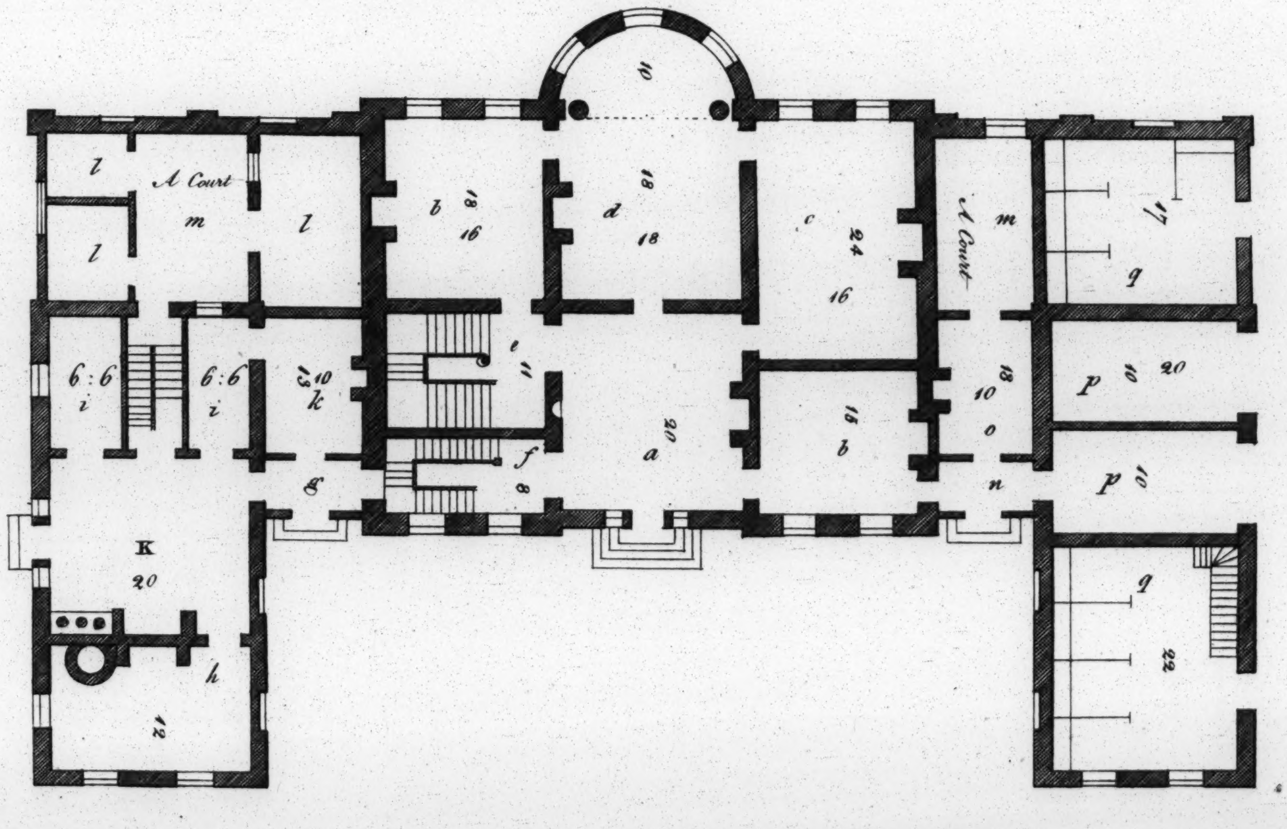


T. Rawlins inv. et del.

T. Miller sculp.

Pl. XXXI.

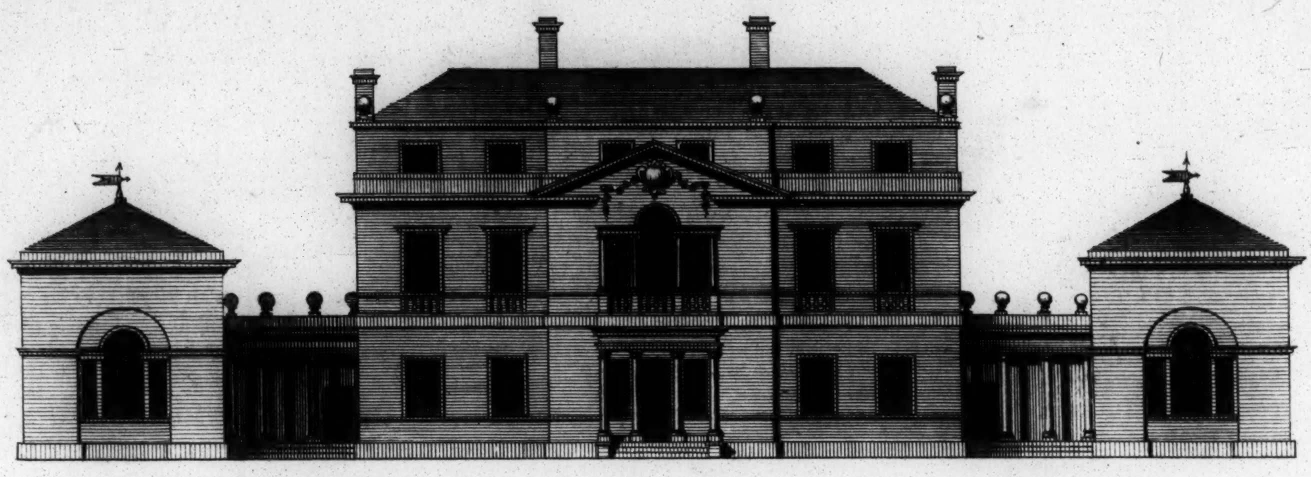


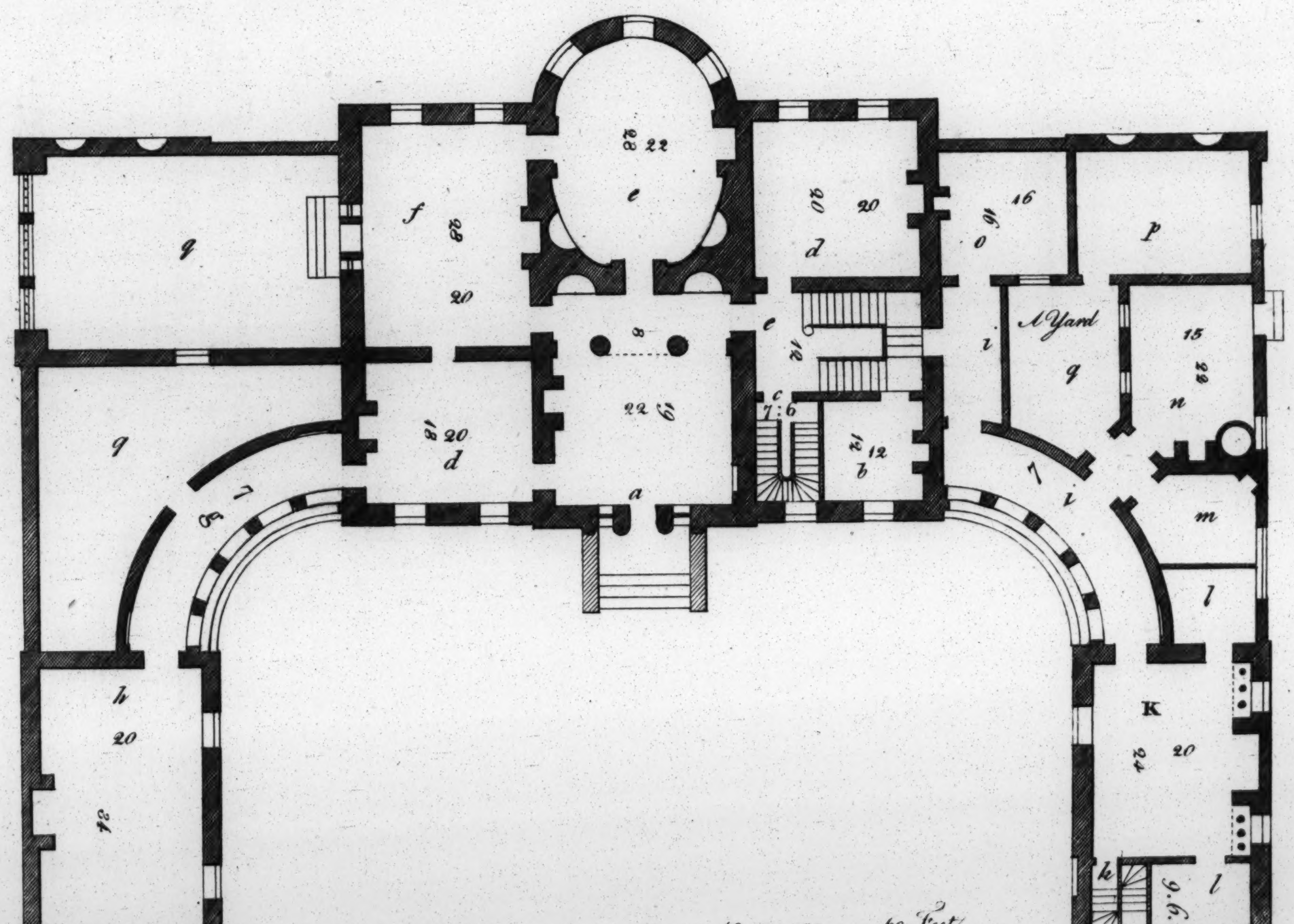


T. Rawlins in. & del.

T. Miller sculp.

Pl. XXXII.





T. Rawlins inv. et del.

T. Miller sculp.

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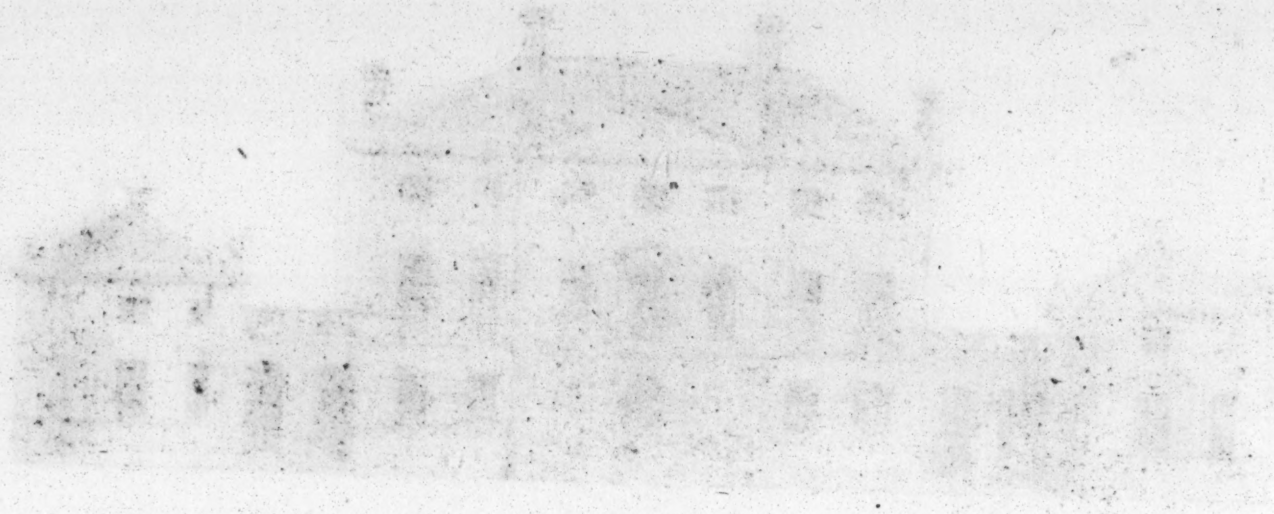
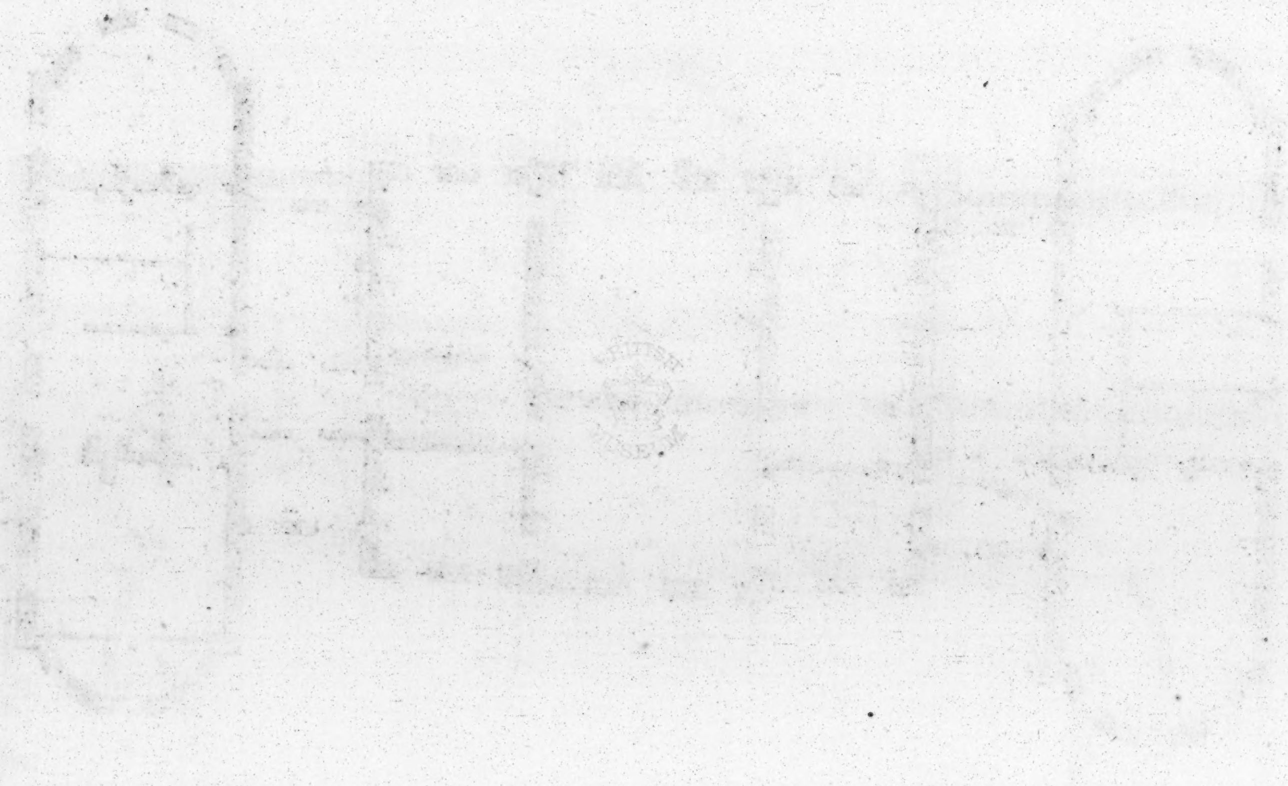
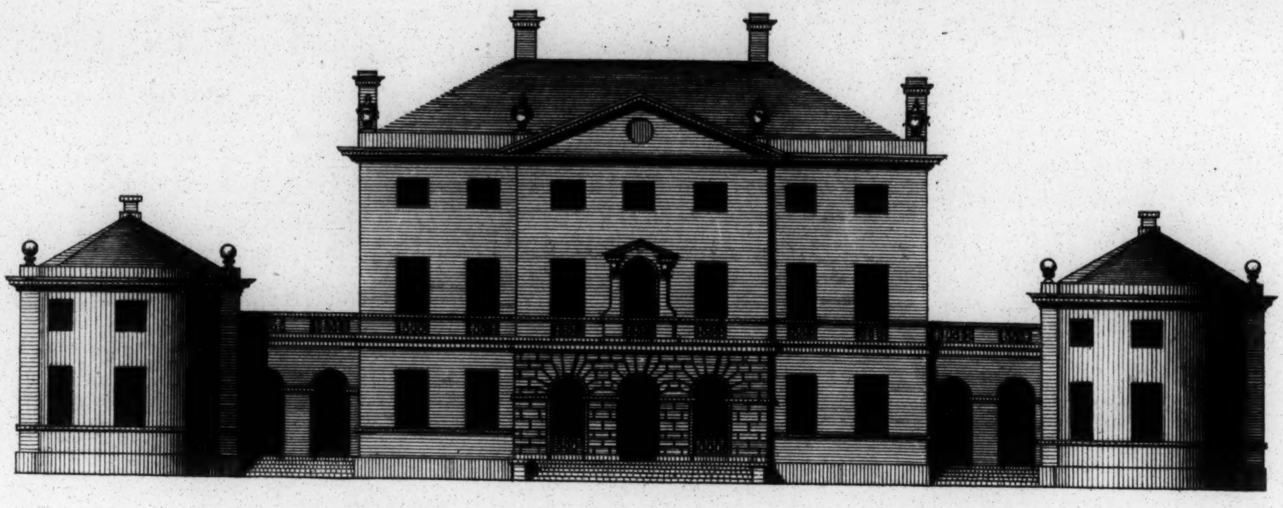
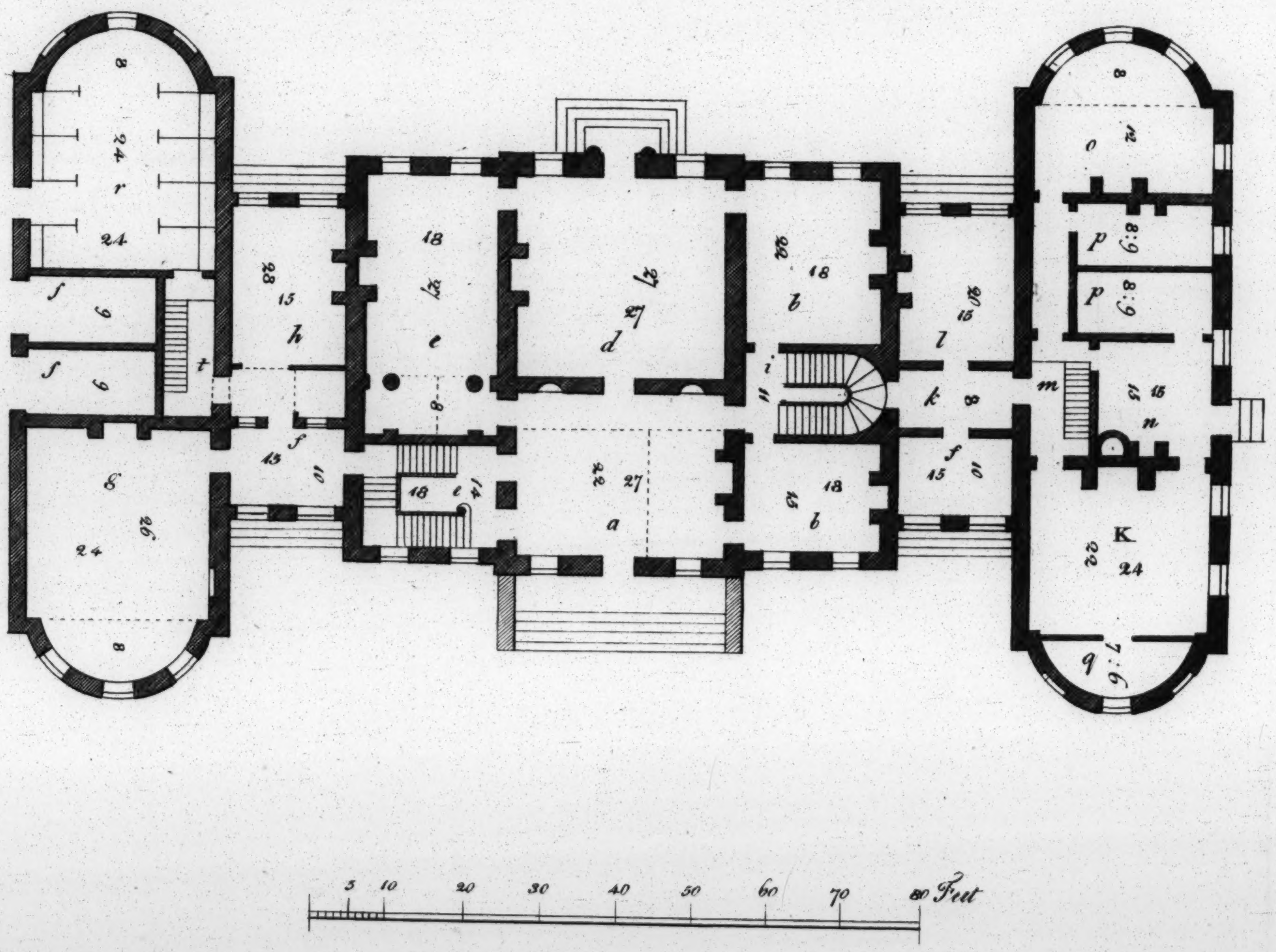




Pl. XXXIII.

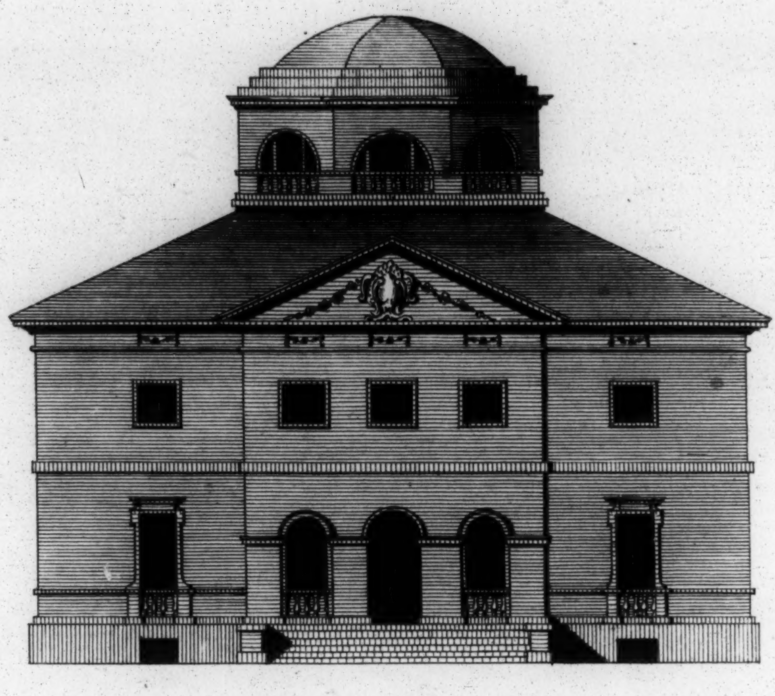


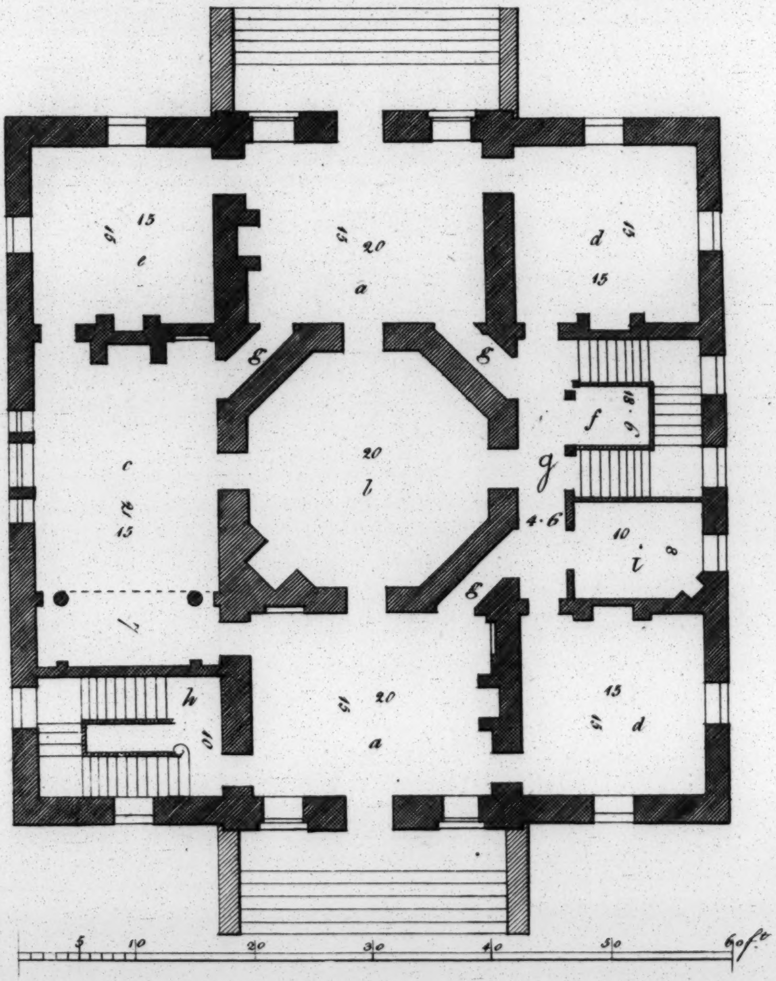


T. Rawlins inv. et del.

T. Miller sculp.

Pl. XXXIV.

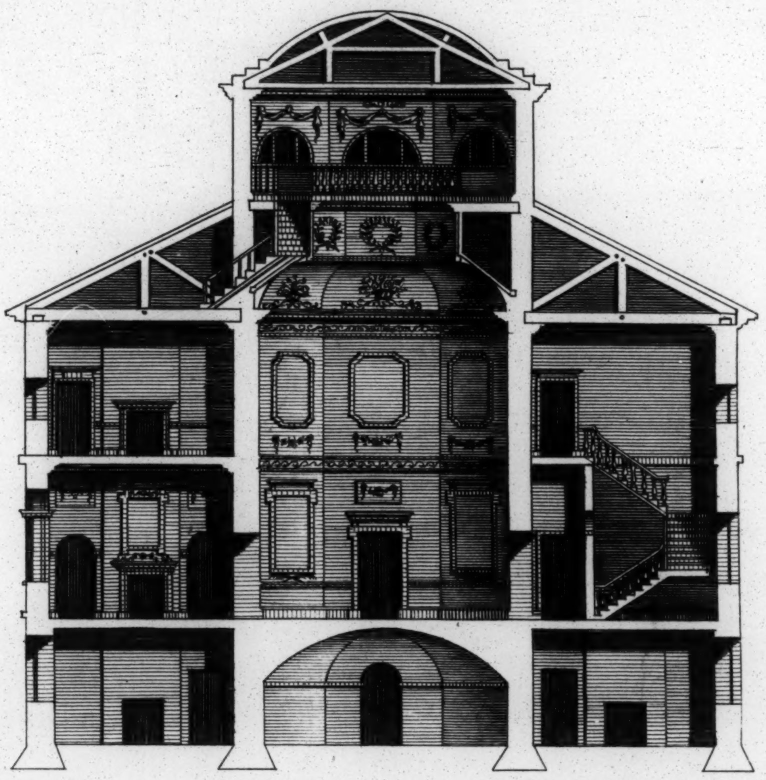




T. Rawlins inv. et del.

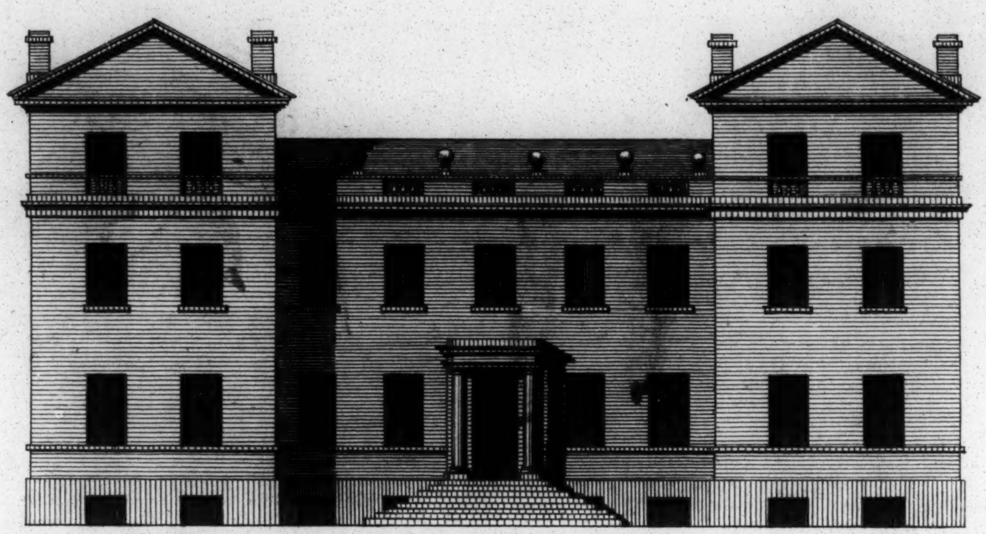
T. Miller sculp.

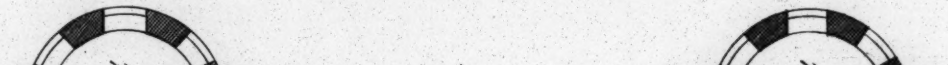
Pl. xxxv.



T. Rawlins inv. et del.

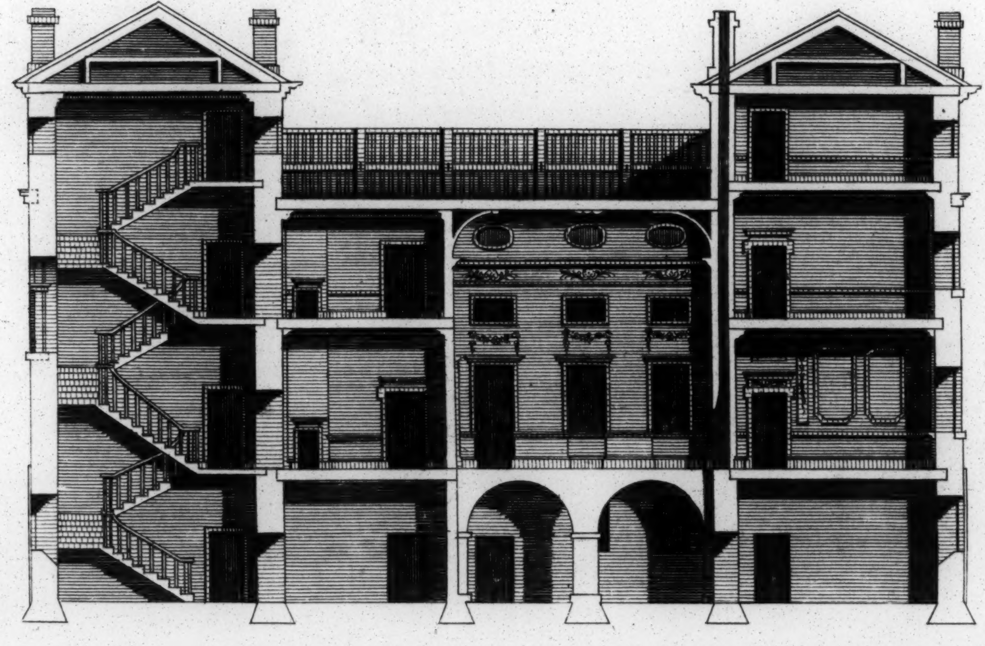
T. Miller sculp.





T. Rawlins inv et del.

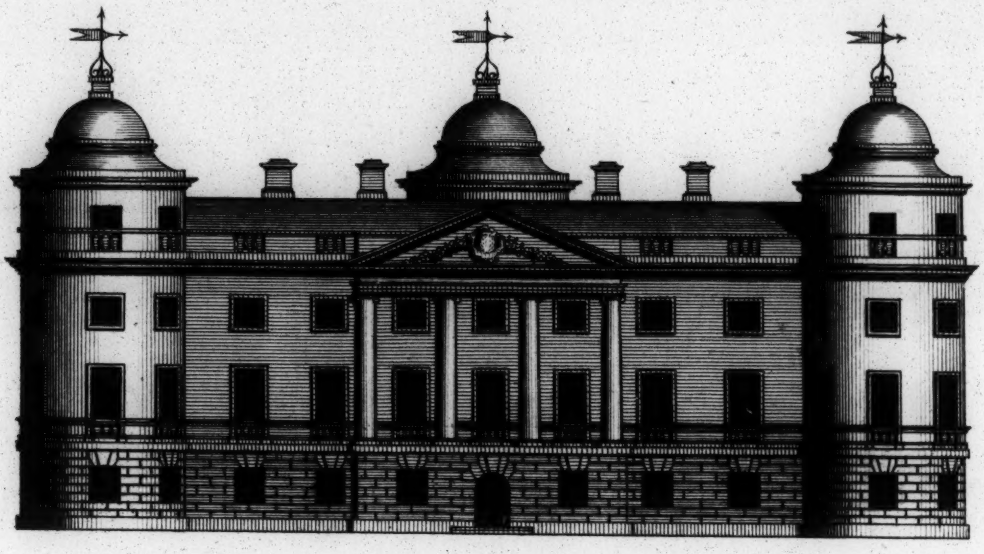
T. Miller sculp.

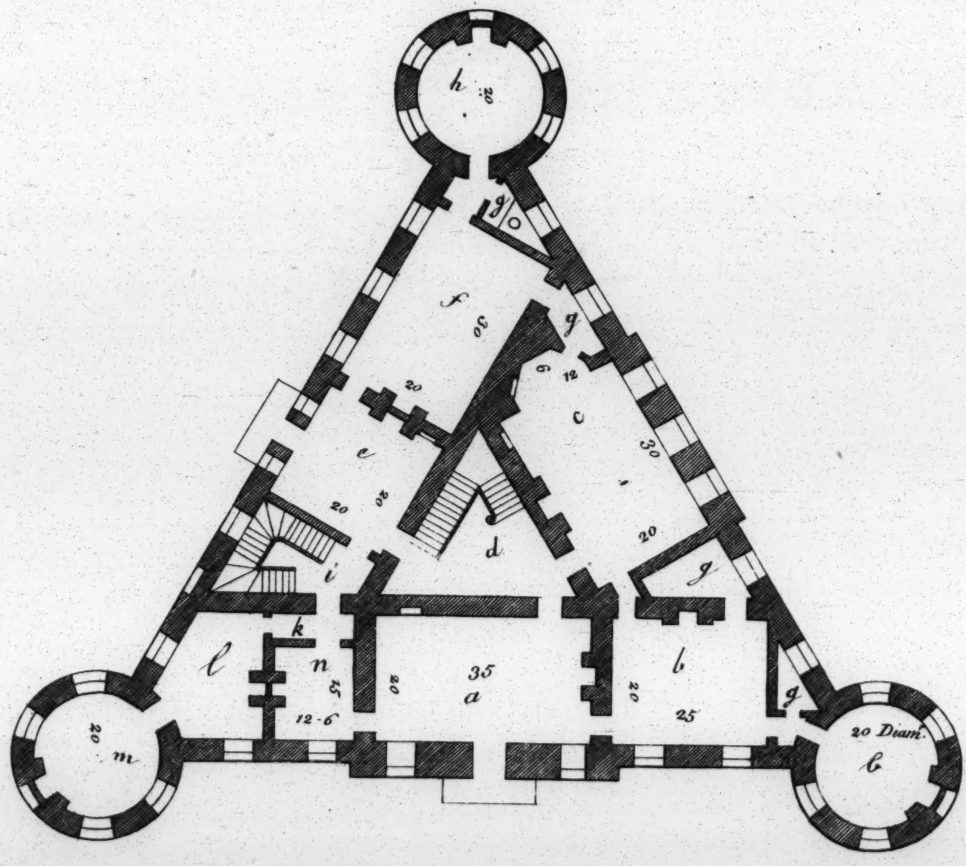


T. Rawlins inv. et del.

T. Miller sculp.

Pl XXXVIII

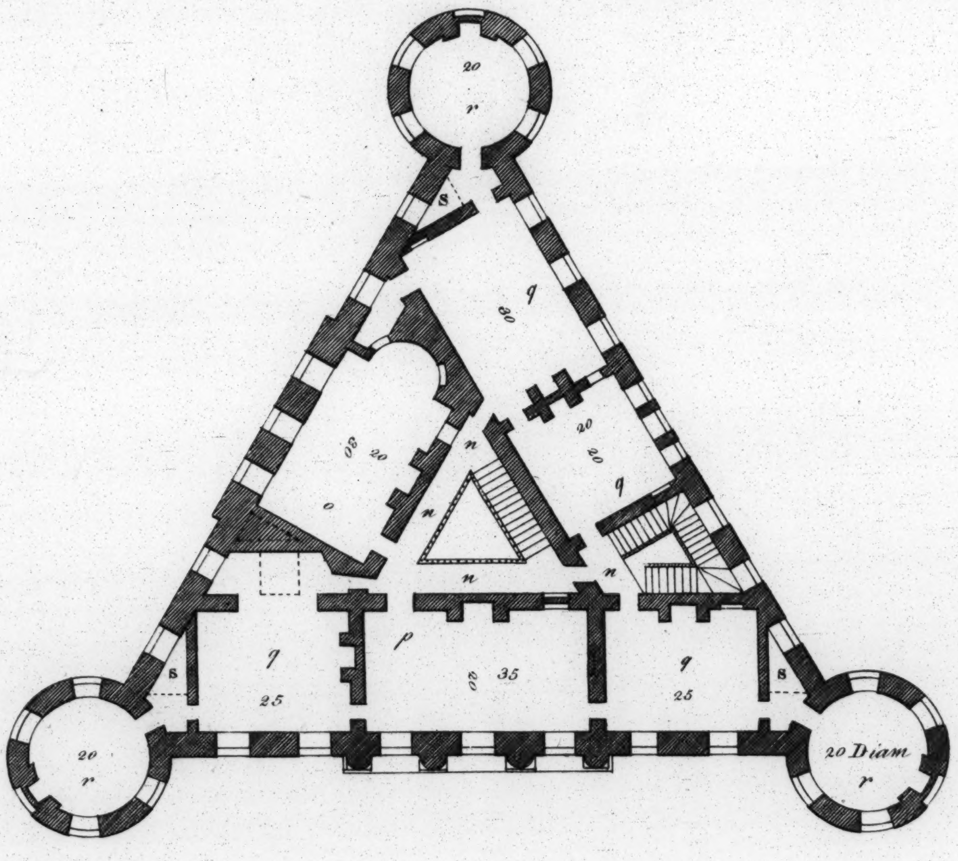




T. Rawlins Inv.ᵗ

T. Miller sculp.

Pl. XXXIX.

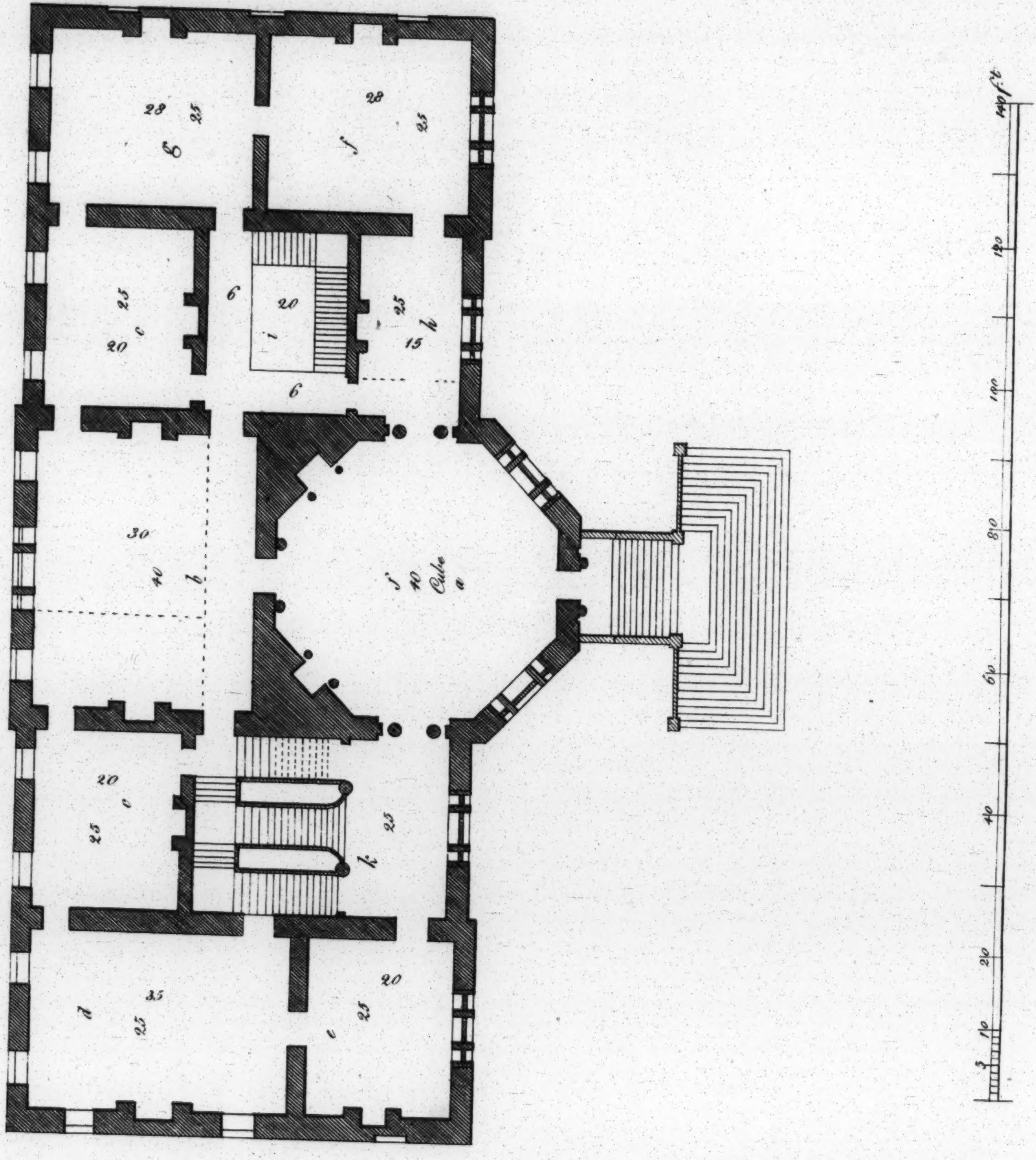


A Plan of the principal Floor.

T. Rawlins inv. et del.

T. Miller sculp.

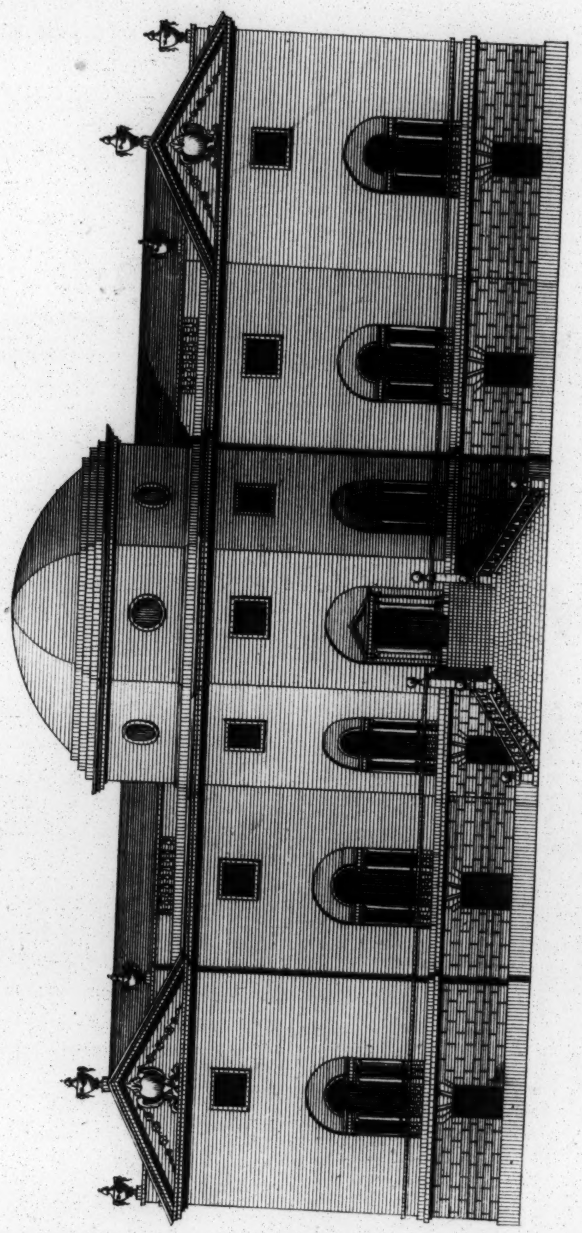
Pl. XL



T. Rawlins in. et del.

T. Miller sculp.

Pl. XLI.

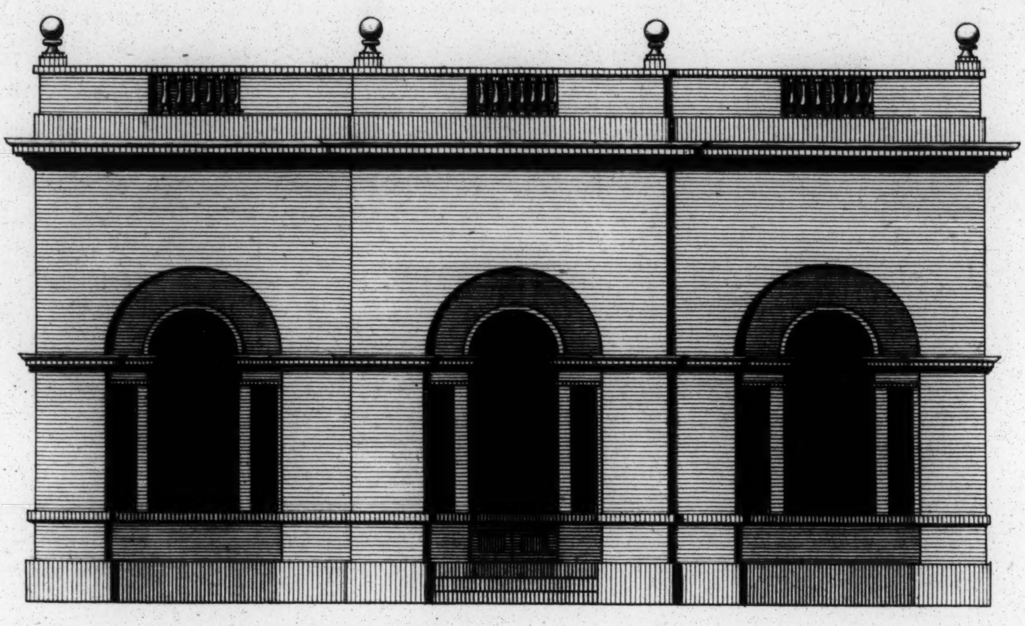


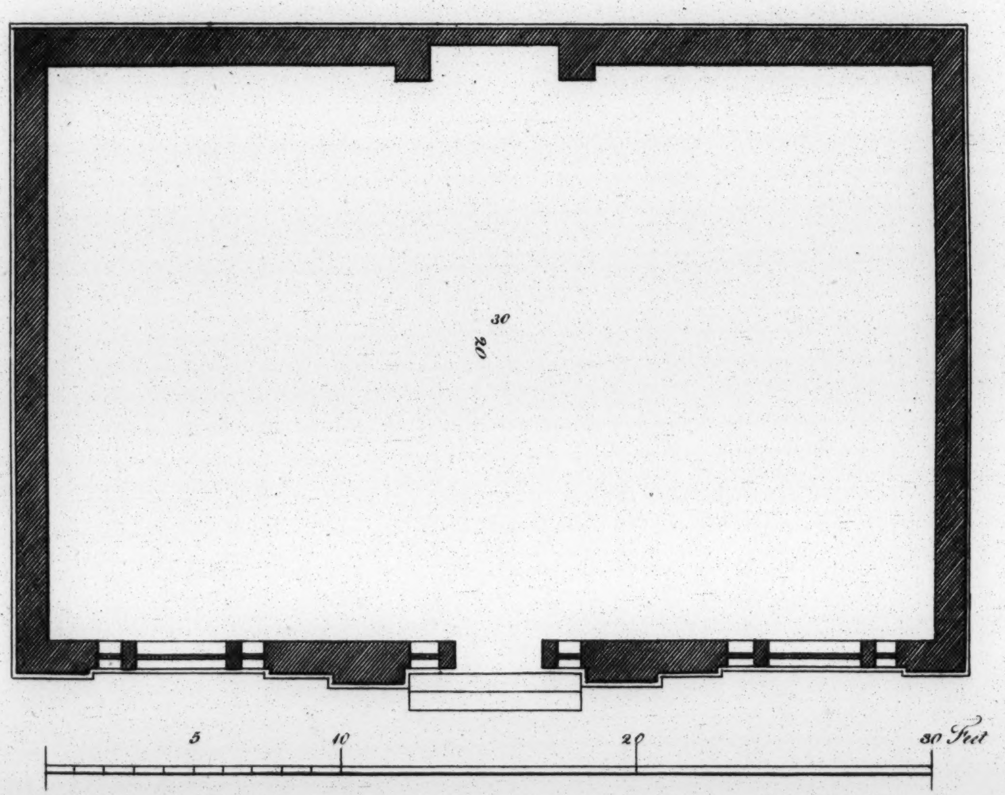
T. Rawlins inv. et del.

T. Miller sculp.

MUSEUM

Pl. XLII.

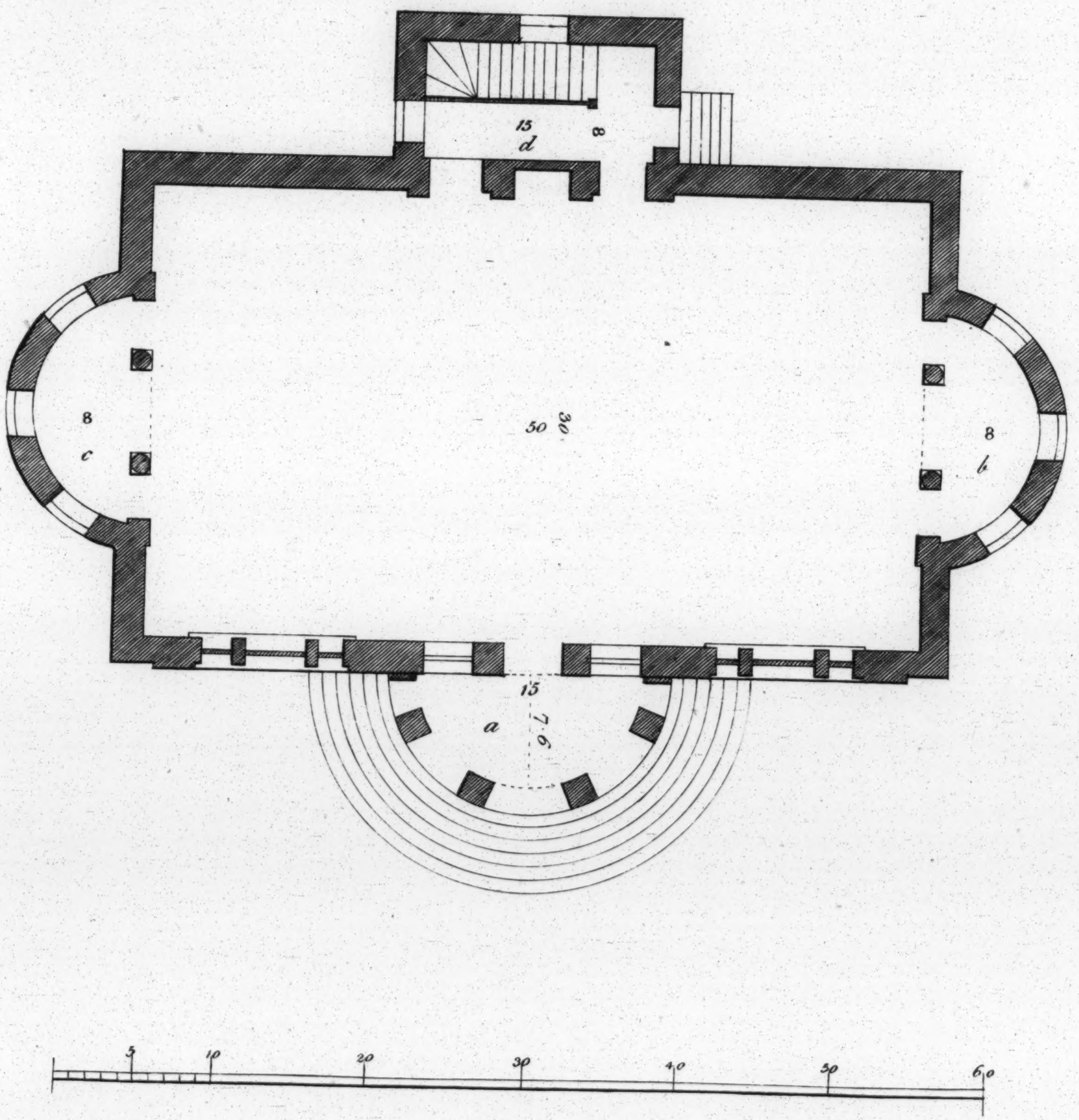




T. Rawlins inv. et del.

T. Miller sculp.

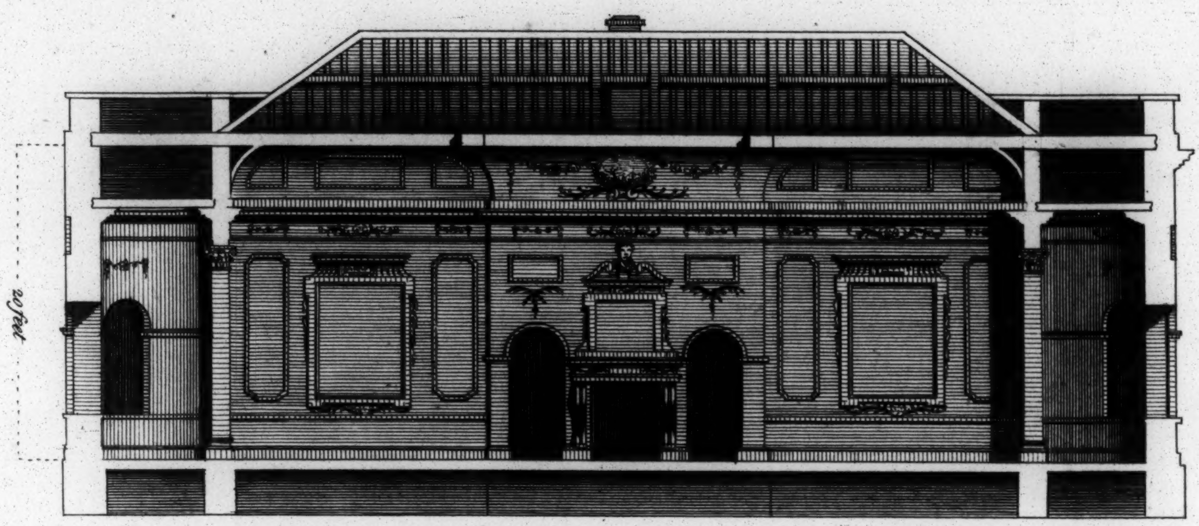
Pl. XLIII.

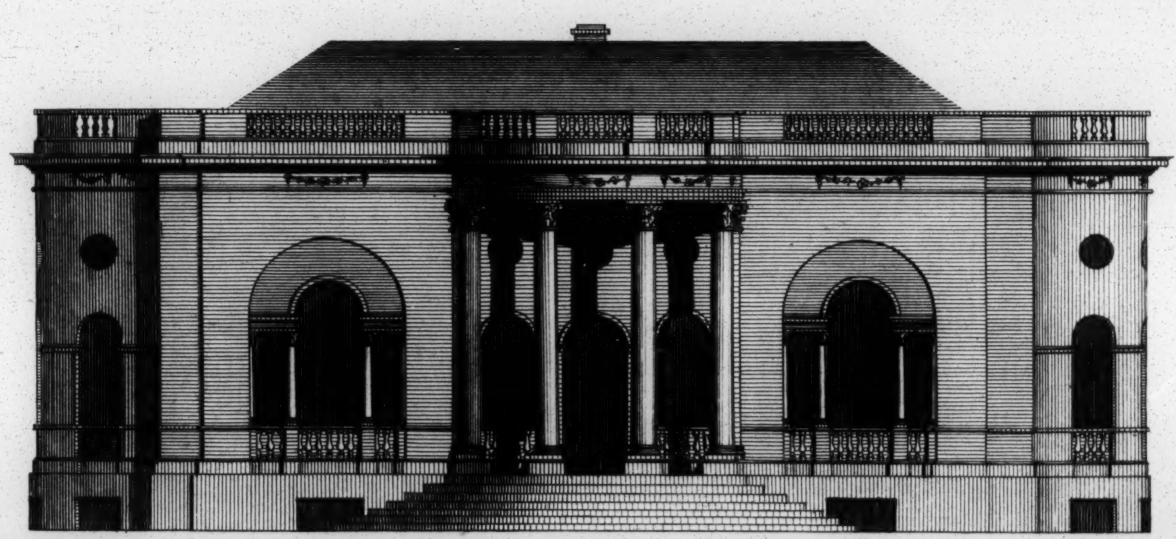


T. Rawlins inv. et del.

T. Miller sculp.

Pl. XLIV.



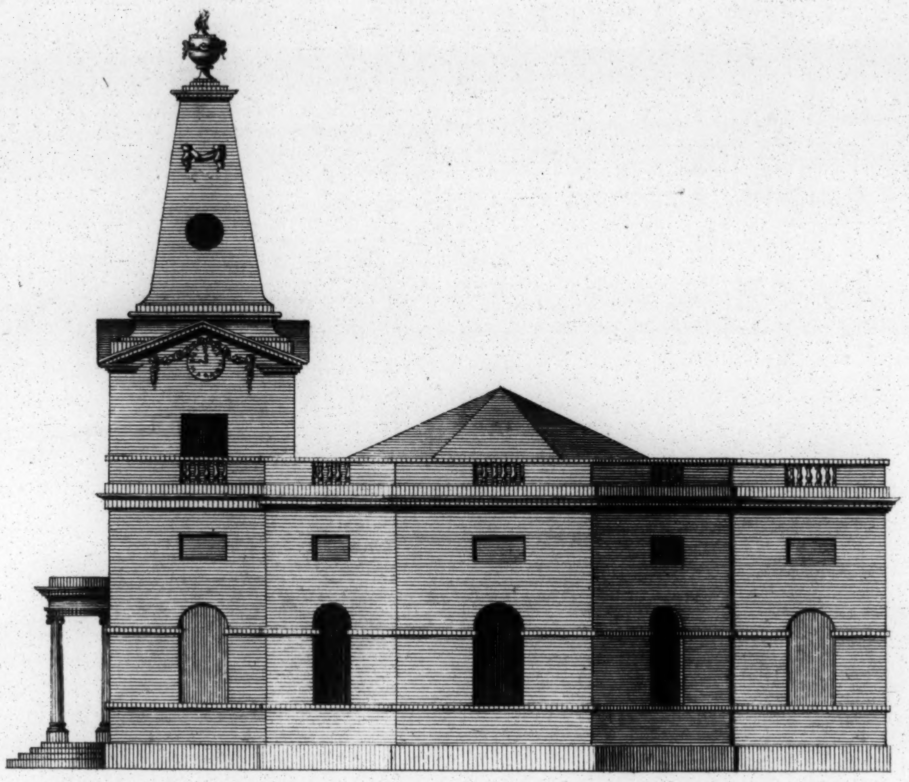


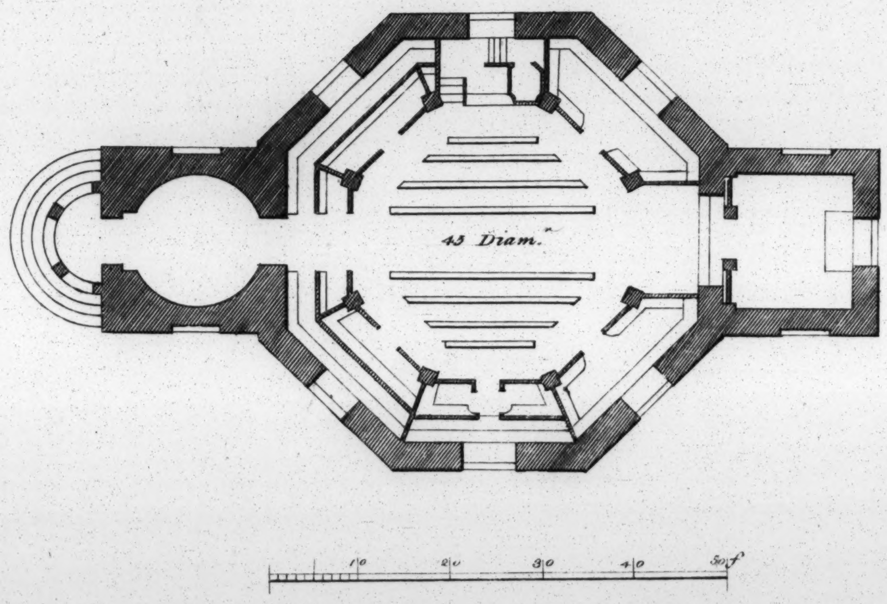
T. Rawlins inv. et del.

T. Miller sculp.

MUSEUM

Plate XLV.

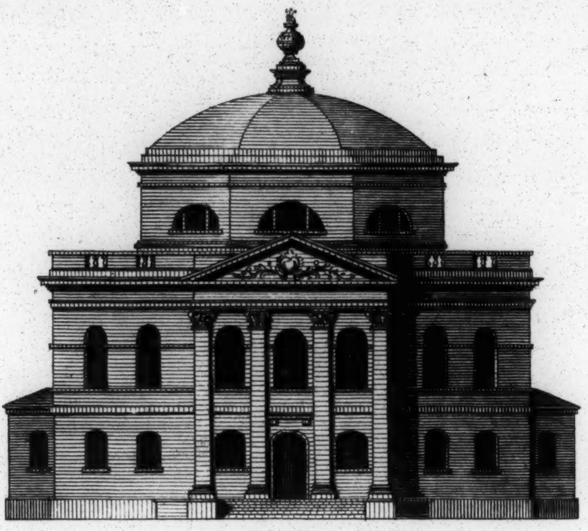


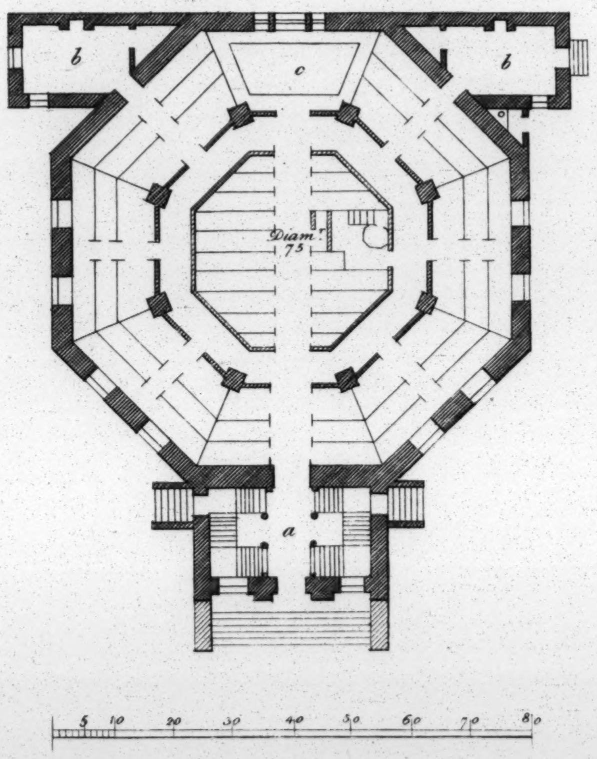


T. Rawlins inv. et del.

T. Miller sc.

Pl. XLVI.

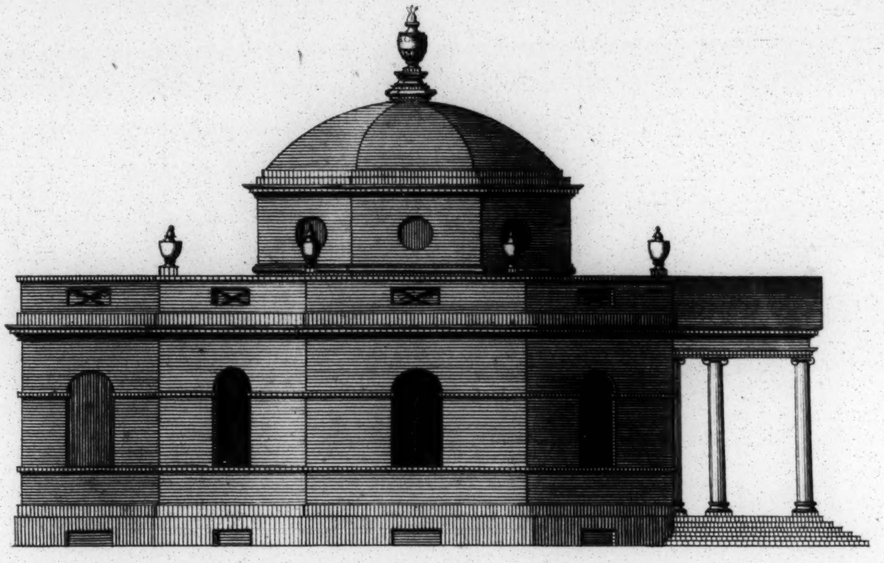


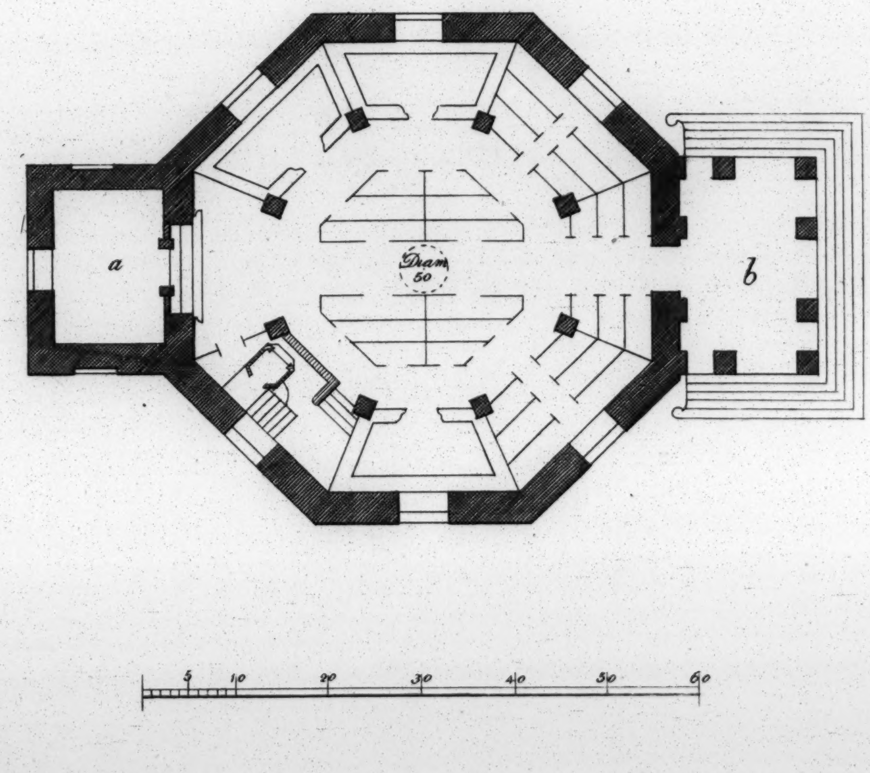


T. Rawlins inv. et del.

T. Miller sculp.

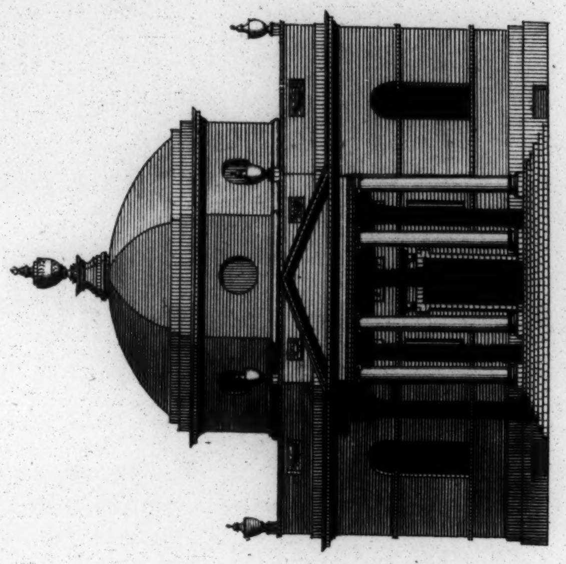
Pl. XLVII.



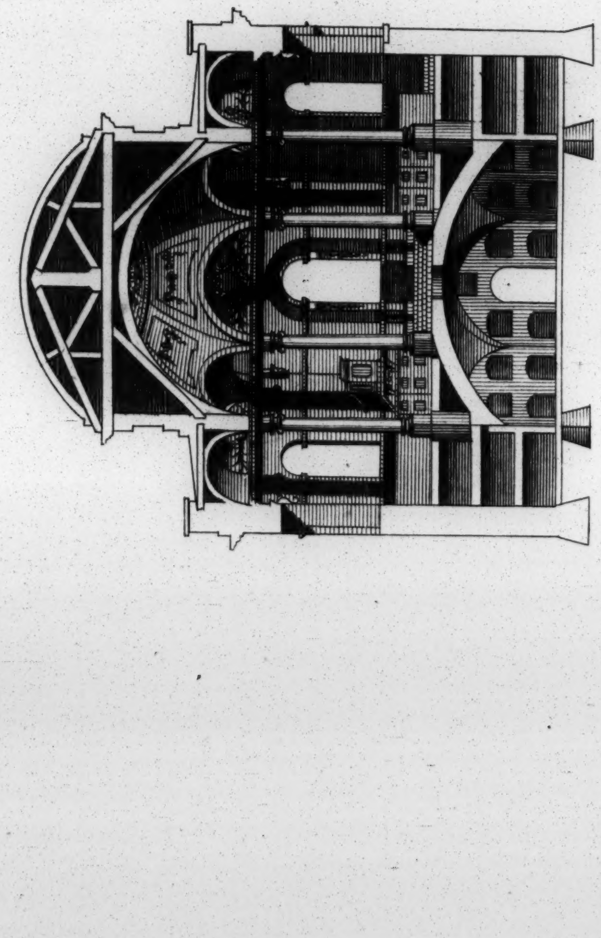


T. Rawlins inv. et del.

T. Miller sculp.



The West End

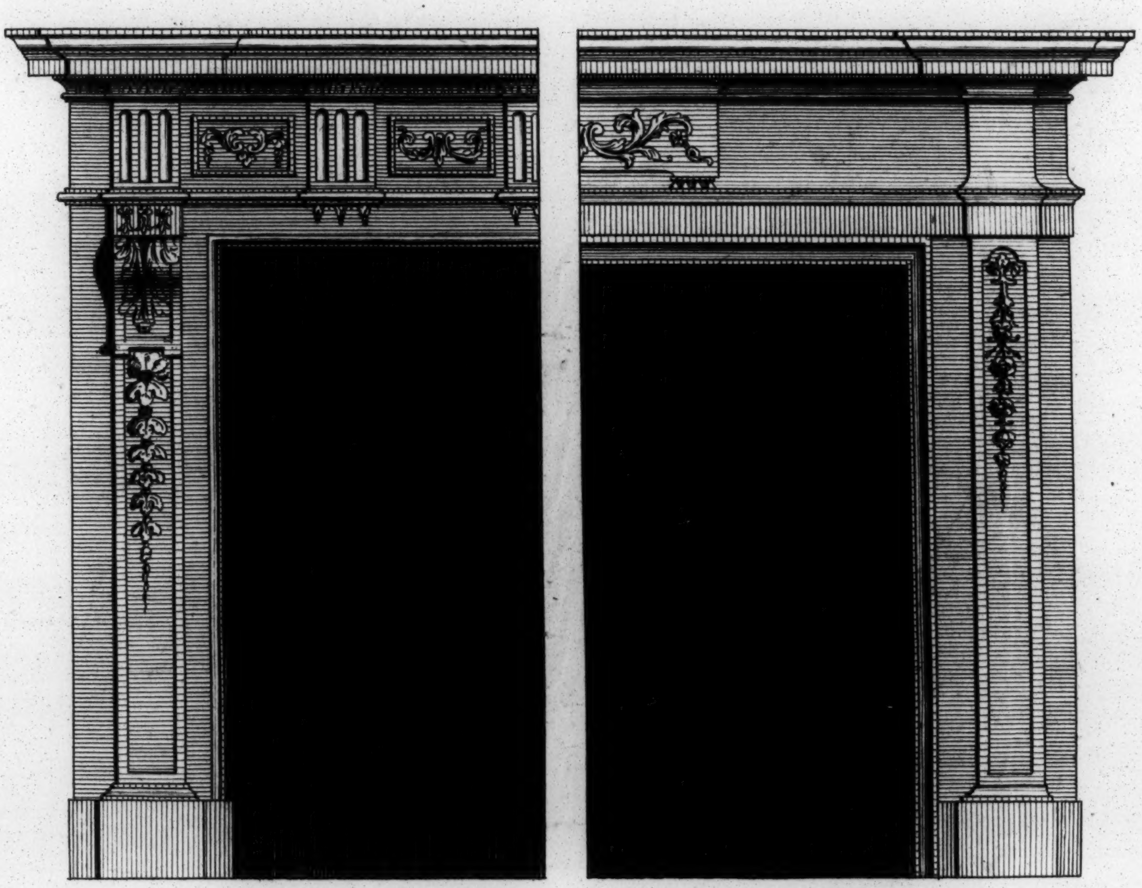


Section

T. Rawlins inv. et del.

T. Miller sculp.

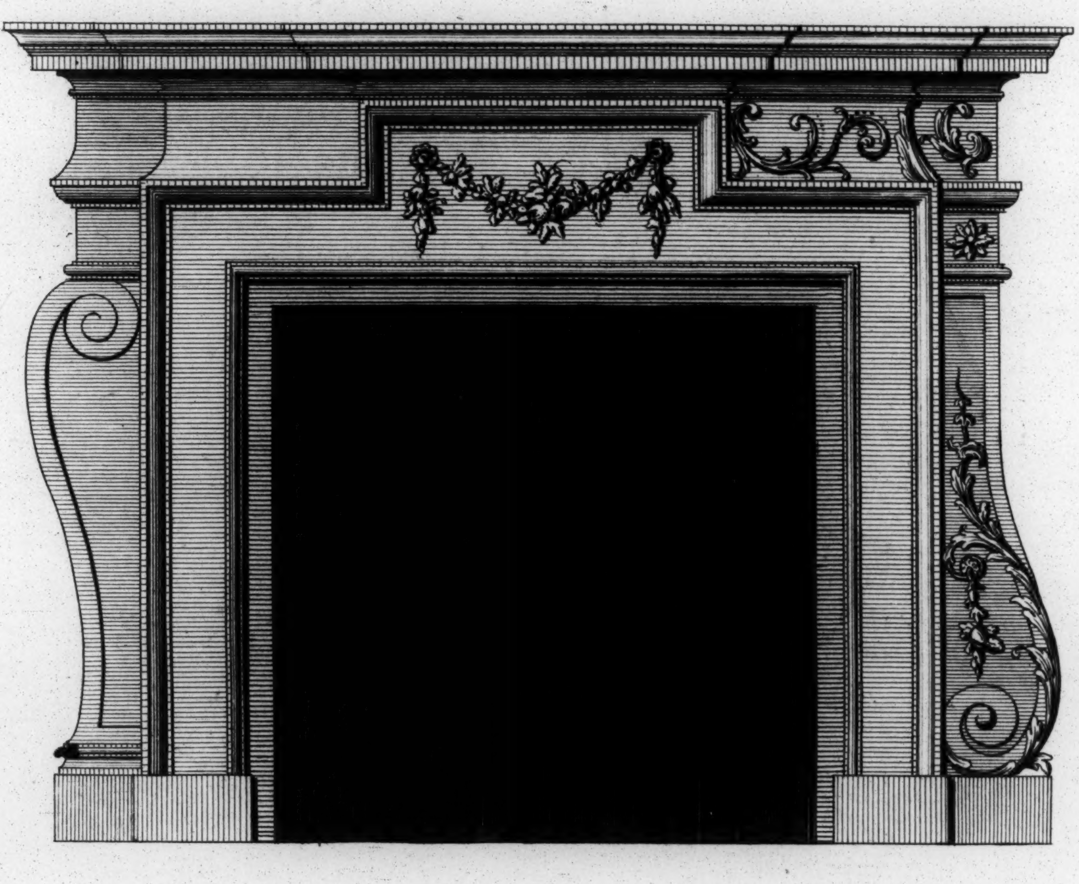
Pl. XLVIIII



T. Rawlins inv. et del.

T. Miller sculp.

Pl. L.



T. Rawlins inv. et del.

T. Miller sculp.

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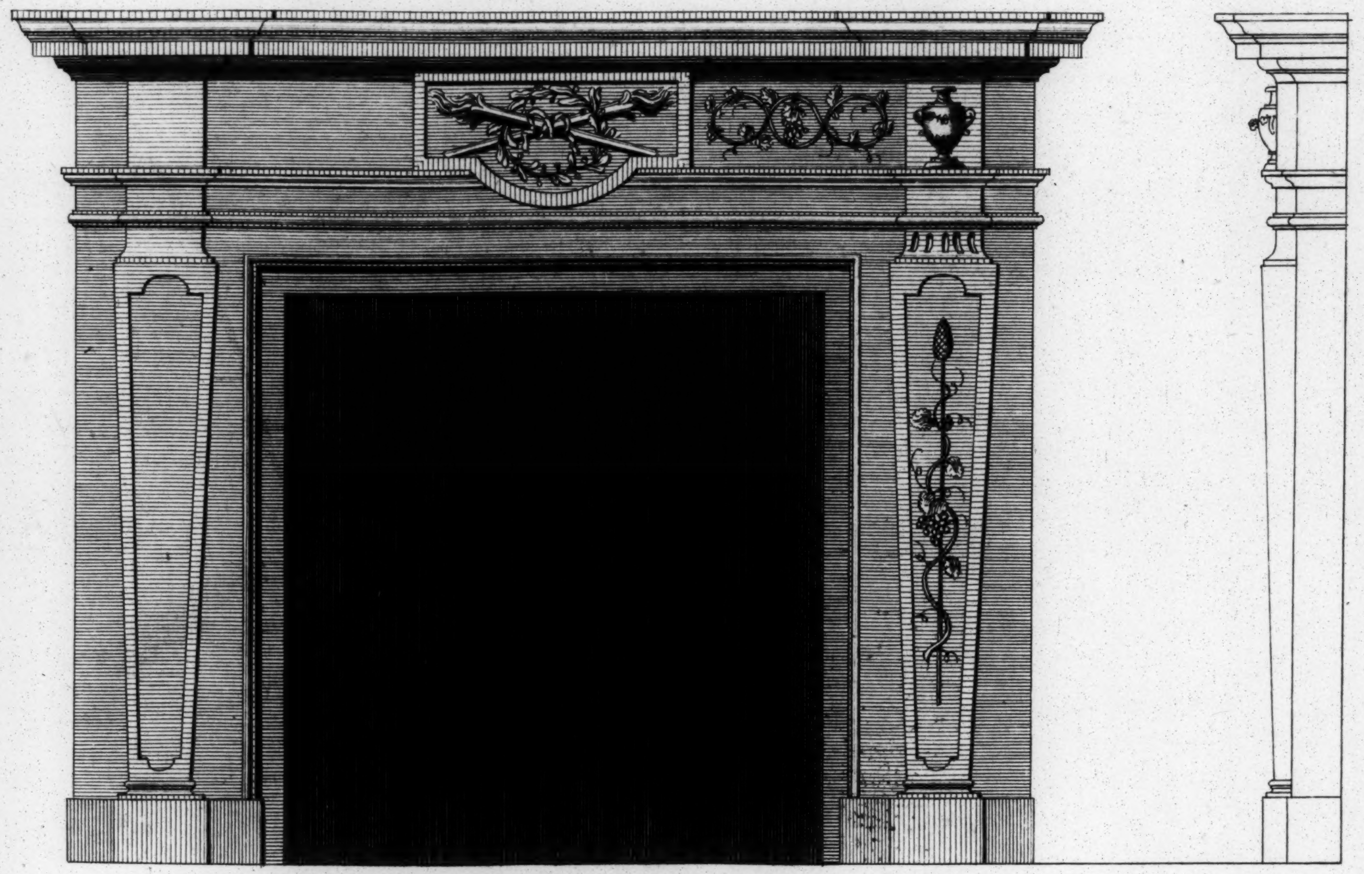
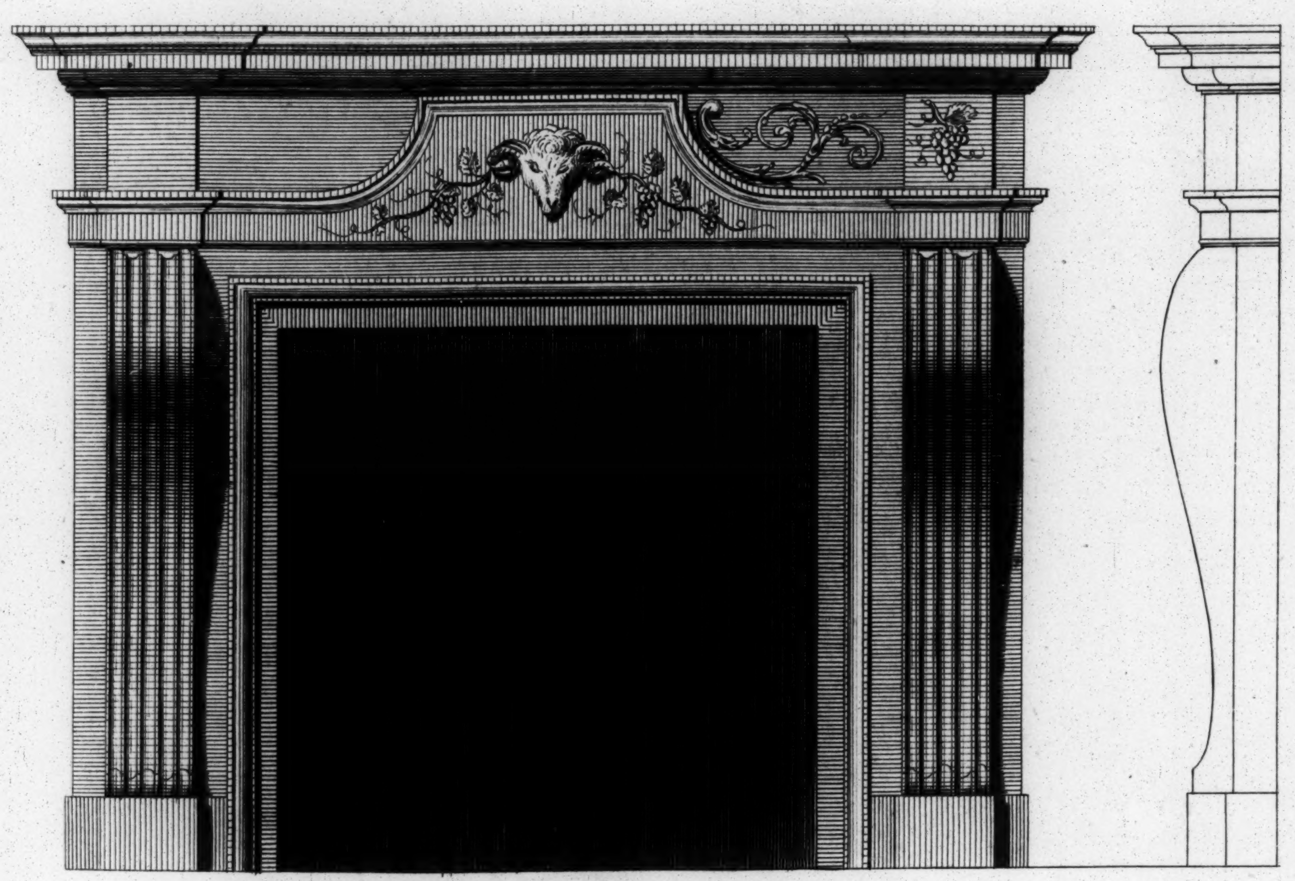
Pl. LI.



T. Rawlins inv. et del.

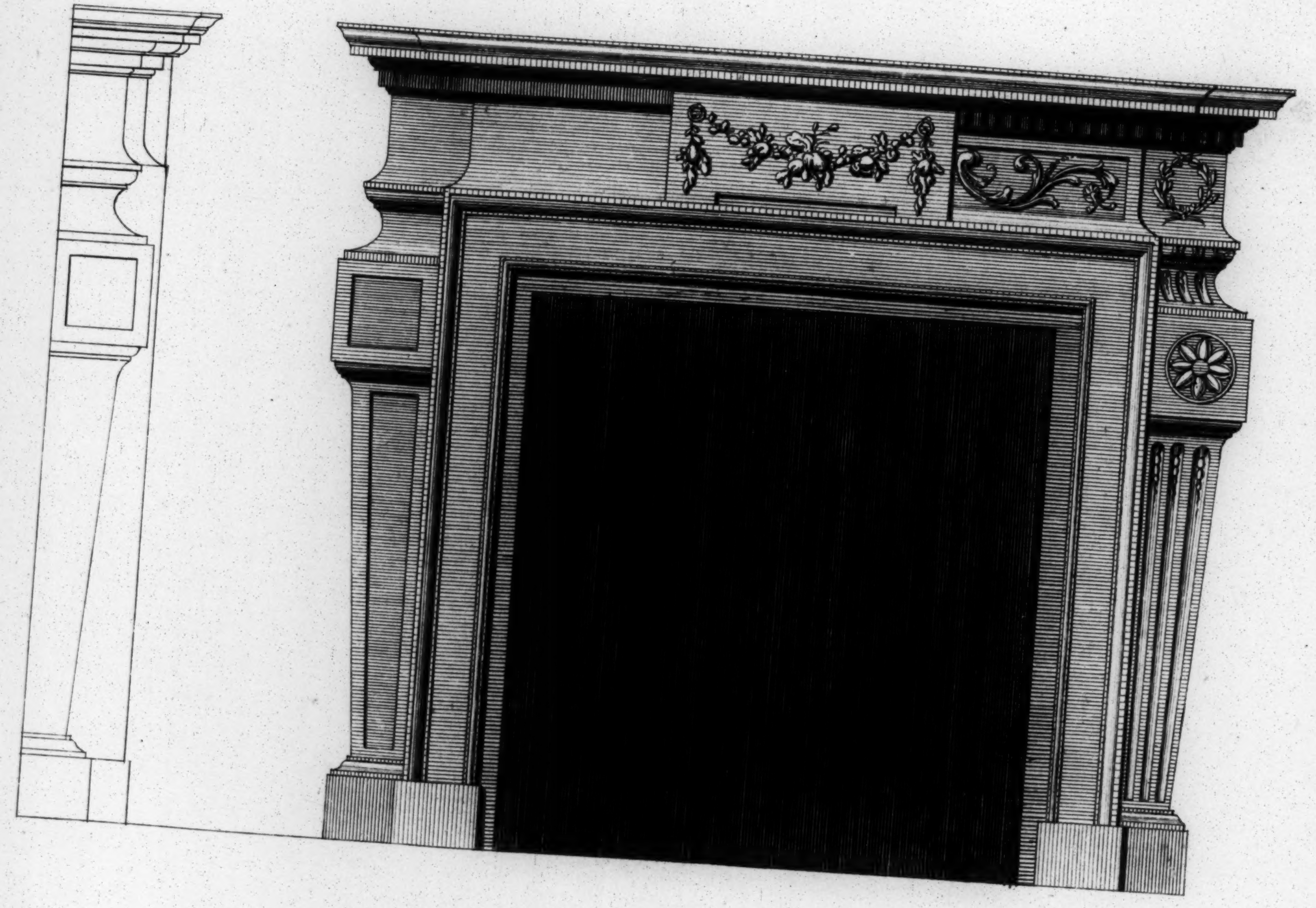
T. Miller sculp.



T. Rawlins inv. et del.

T. Miller sculp.

Pl. LIII.

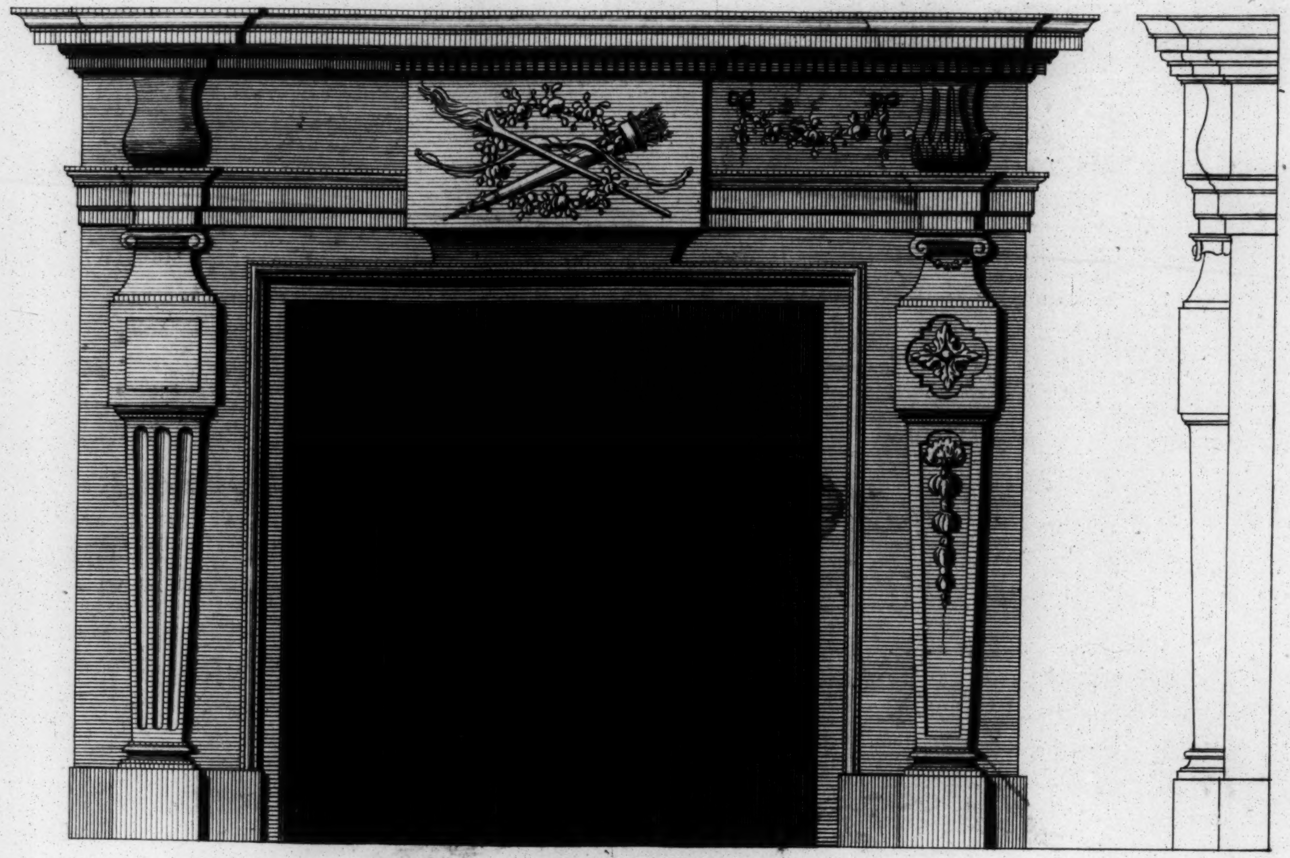


T. Rawlins del

T. Miller sculp.

MUSEU

Pl. LIV.

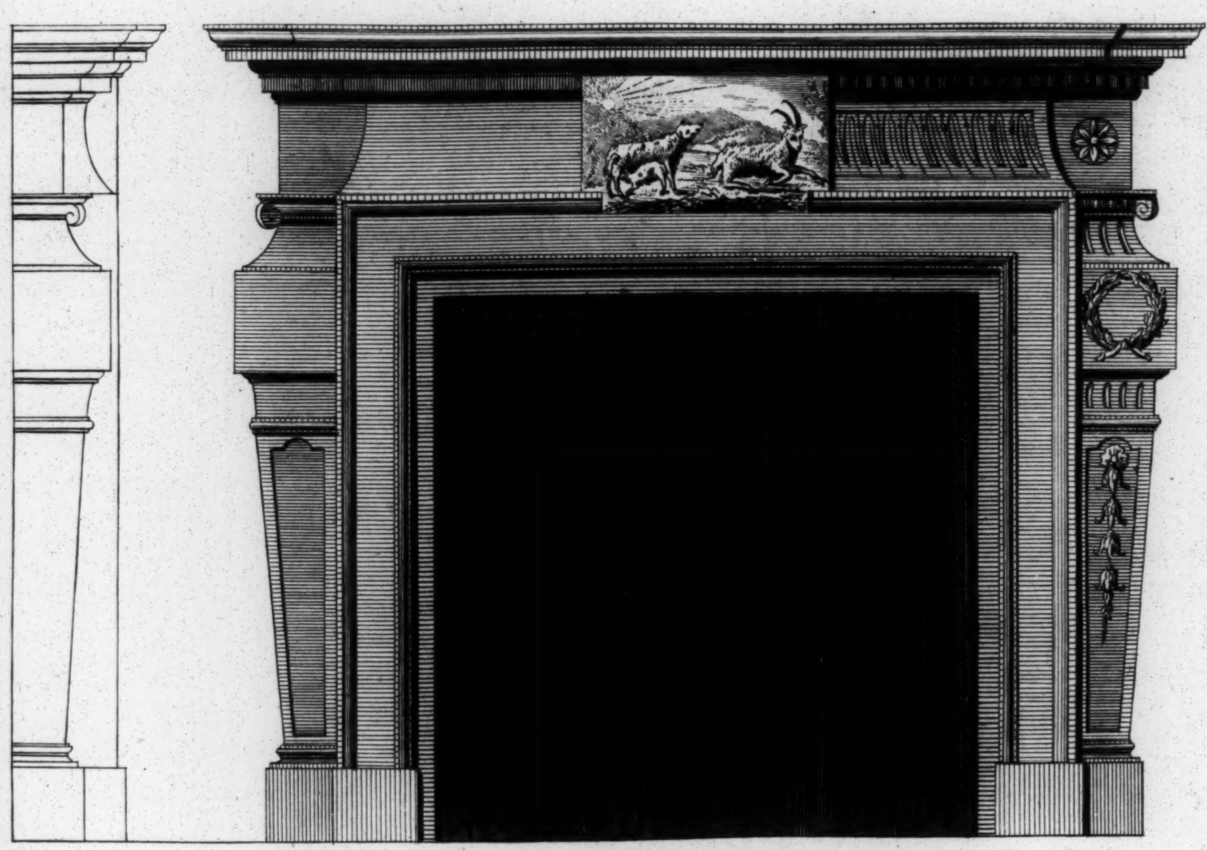


T. Rawlins inv.et del.

T. Miller sculp.

[illegible] MUSEUM

Pl. LV.

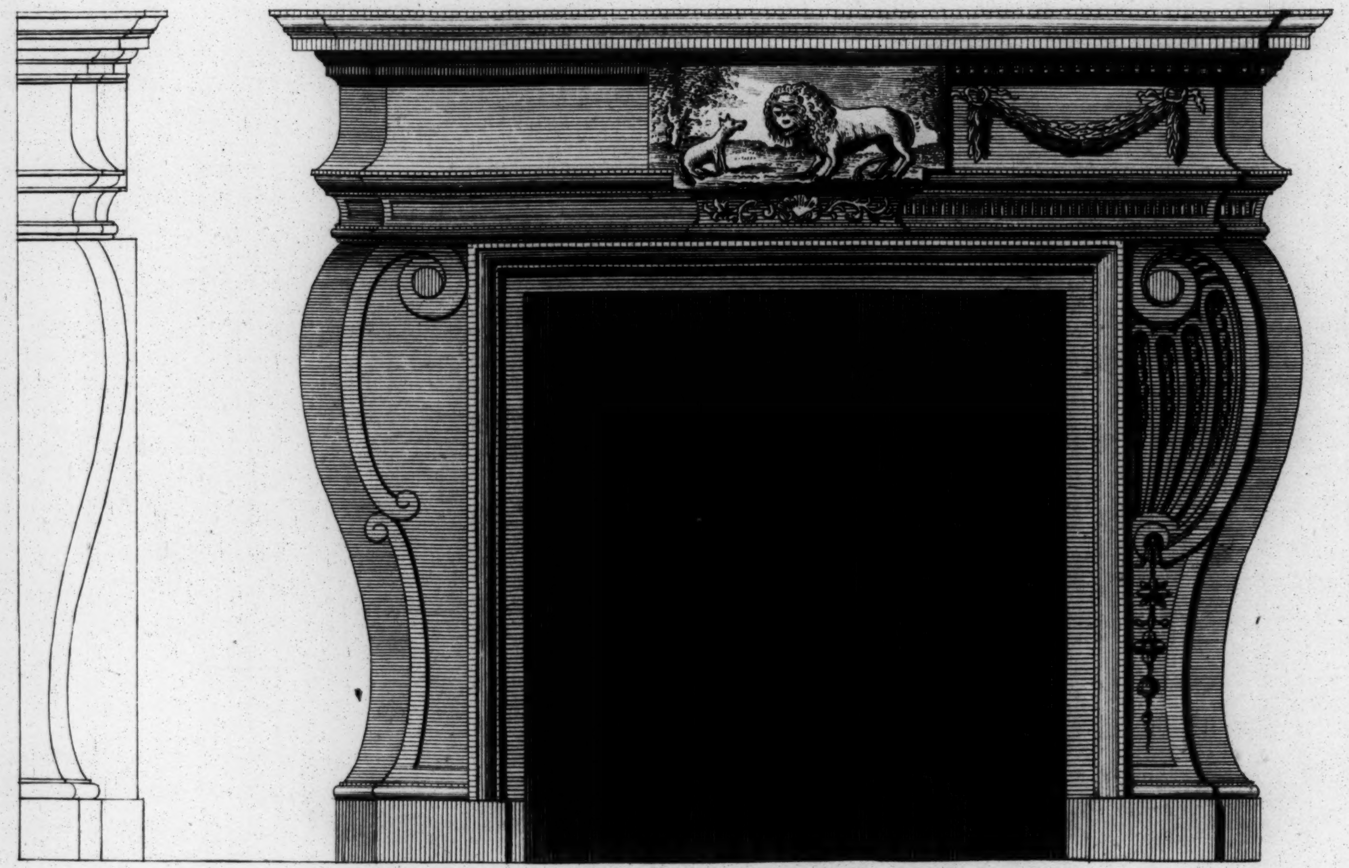


T. Rawlins inv et del.

T. Miller sculp.

[illegible] MUSEUM

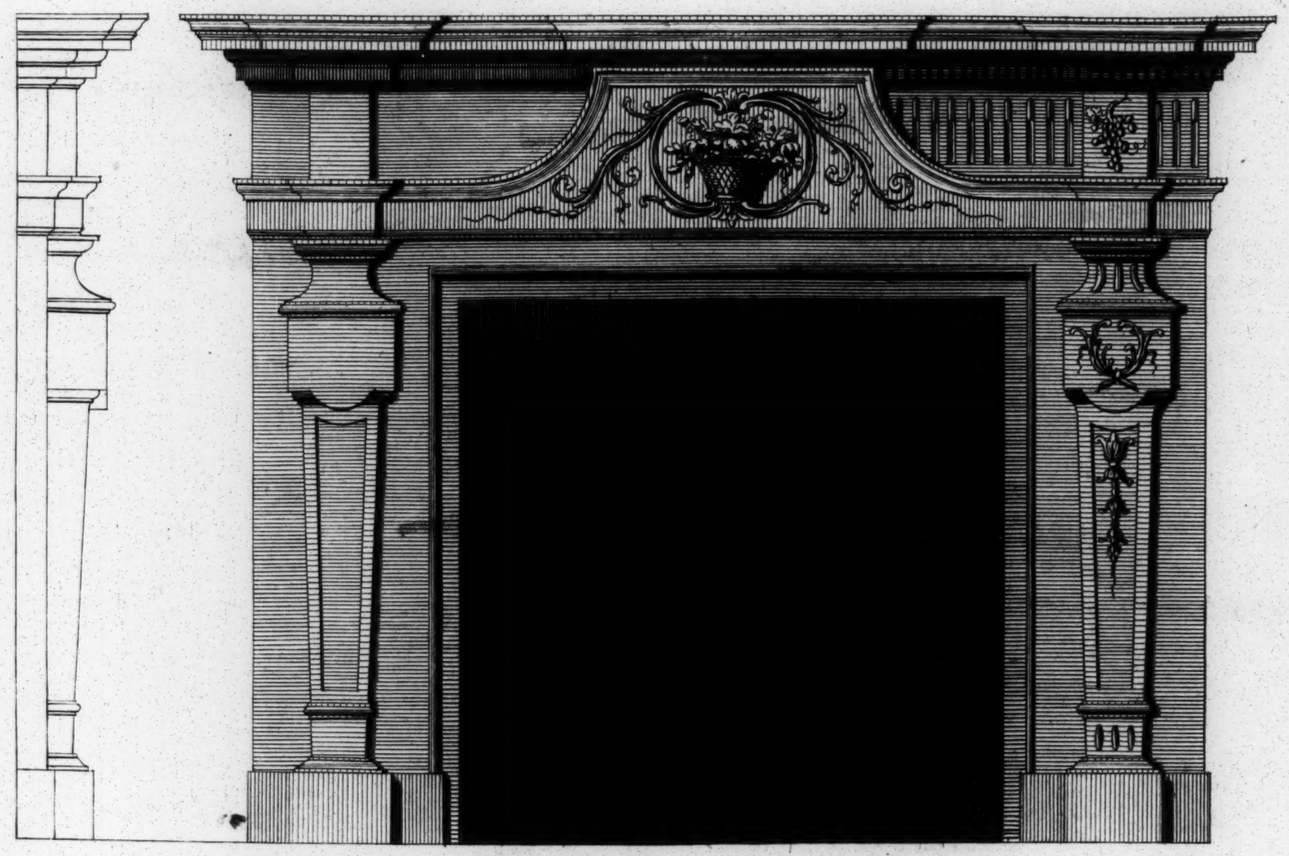
Pl . LVI.



T. Rawlins inv. et del.

T. Miller sculp.

Pl. LVII.



T. Rawlins inv. et del.

T. Miller sculp.

BRITISH MUSEUM

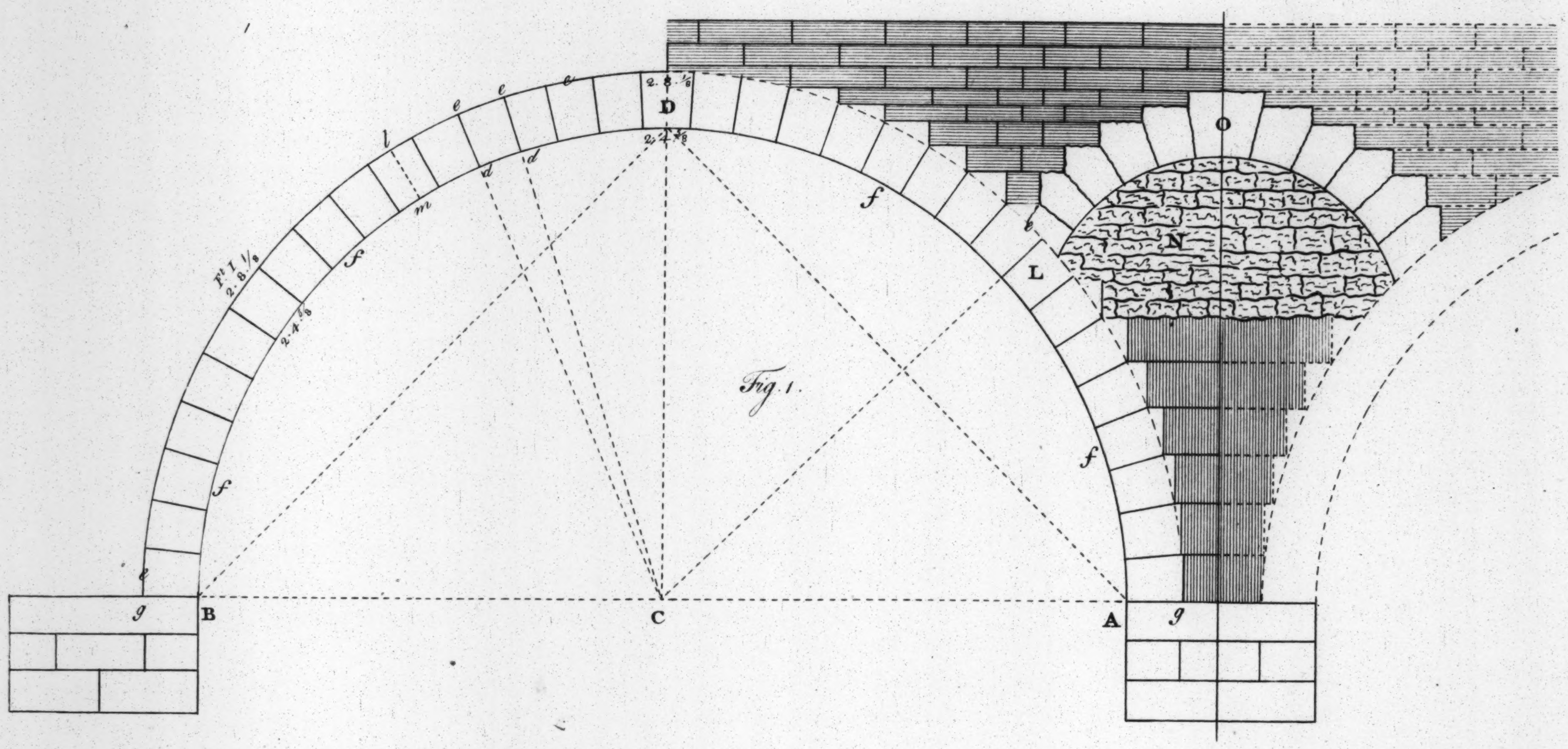


Fig. 1.

N. Rouble Work

O. A rough Arch

T. Rawlins, inv. et del.

T. Miller sculp.

BRITISH MUSEUM

Pl. LIX.

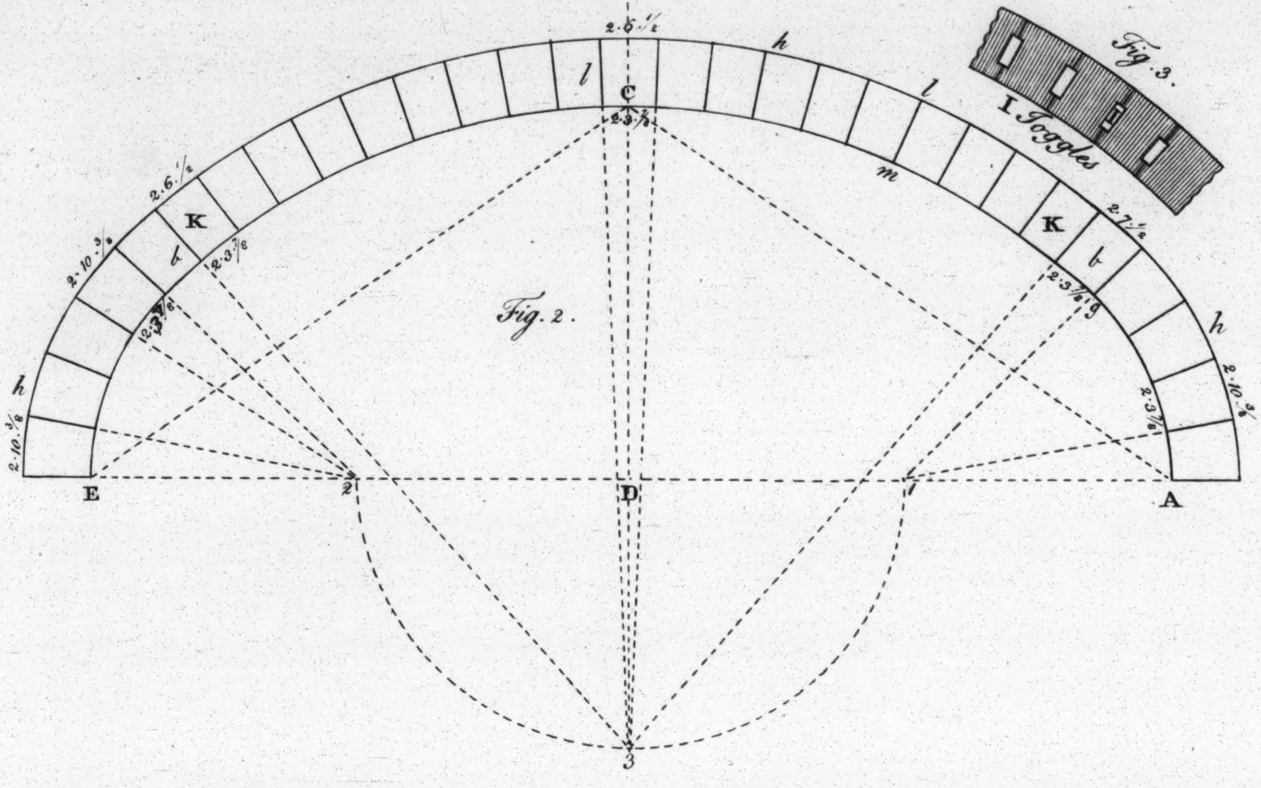


Fig. 2.

Fig. 3.

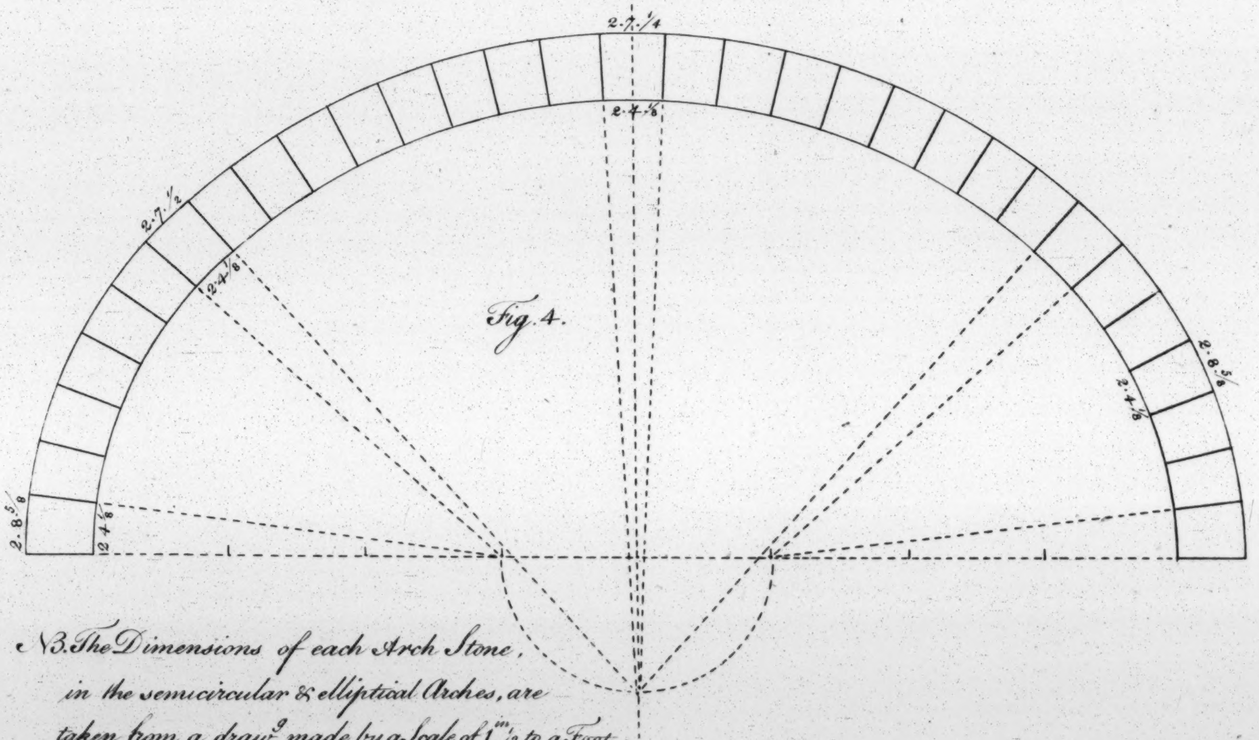
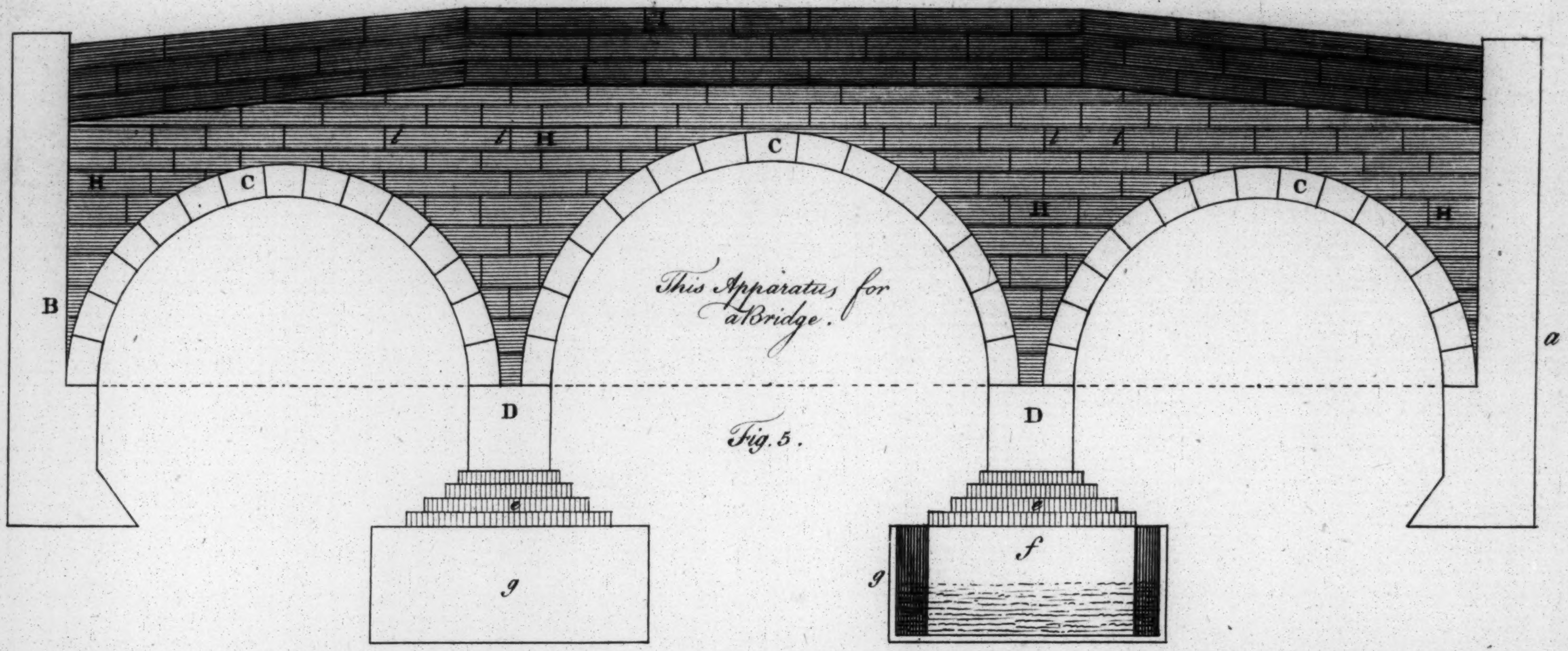


Fig. 4.

N.B. The Dimensions of each Arch Stone, in the semicircular & elliptical Arches, are taken from a draw.g made by a Scale of 1.in 1/2 to a Foot.

T. Rawlins inv. et del.

T. Miller sculp.



This Apparatus for a Bridge.

Fig. 5.

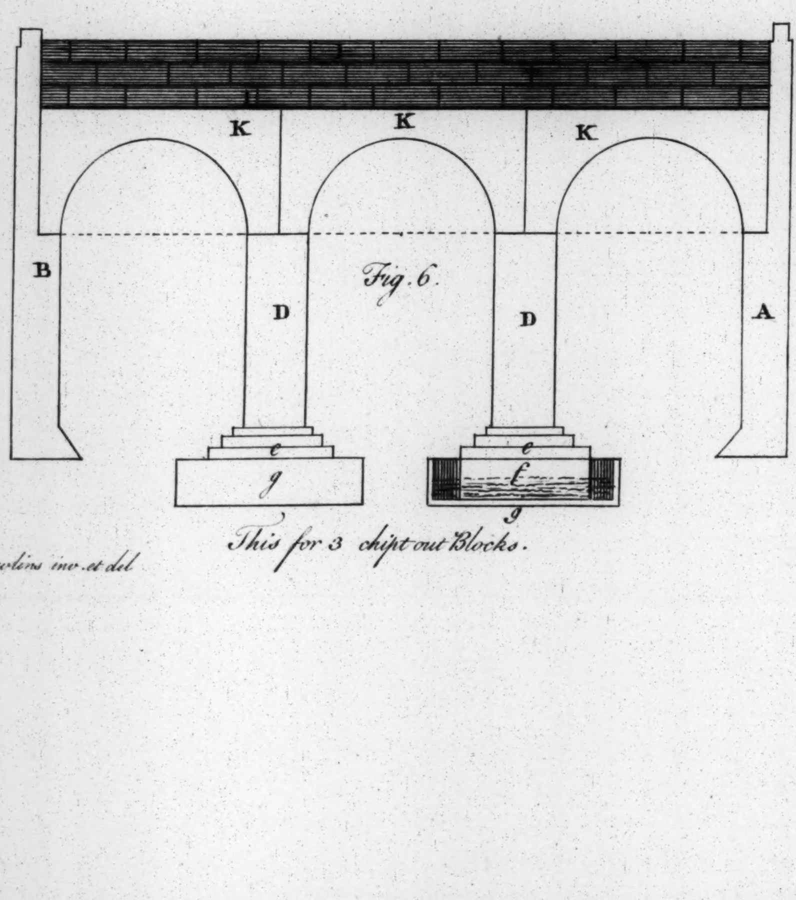


Fig. 6.

This for 3 chipt out Blocks.

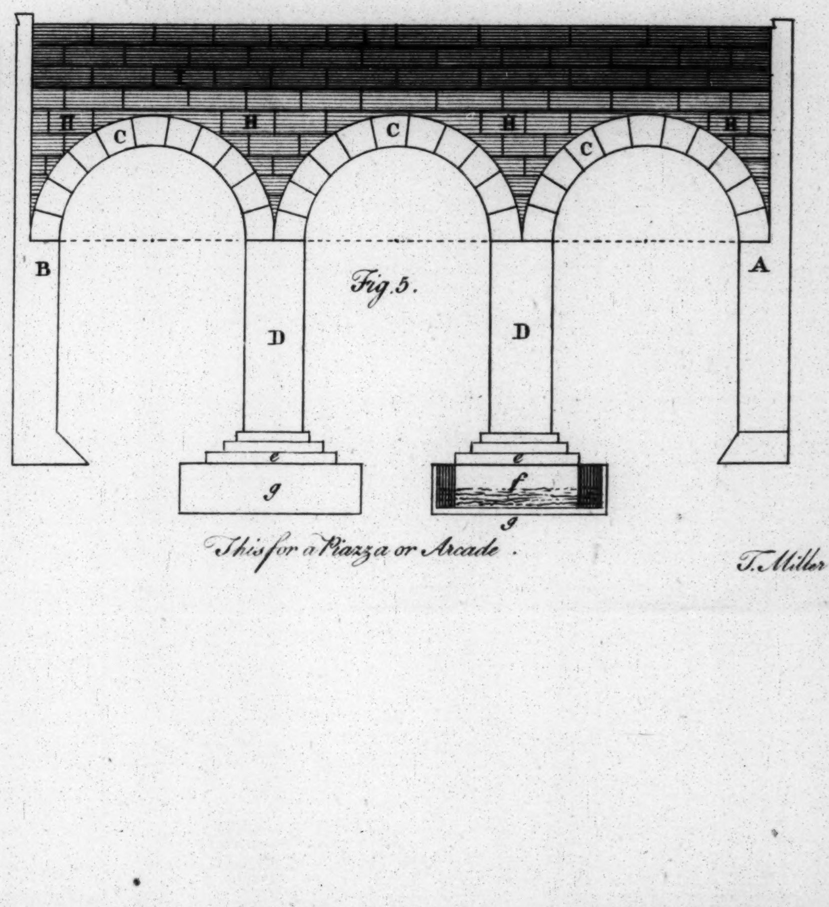


Fig. 5.

This for a Piazza or Arcade.

T. Rawlins inv. et del.

T. Miller sculp.